

**THE
RAILWAY GAZETTE**

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INCORPORATING

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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

Scheme for the First Railway Staff College

AS our last week's issue went to press, Sir Josiah Stamp was making his important announcement at Euston of the decision to establish a Staff College at Derby. Consequently it was possible to include in that issue only a "stop press" editorial note at the last possible moment. Due to the necessary haste with which that note was prepared, an obvious error crept into it, Sir Josiah being reported as alluding to a pay roll of "over £250,000," instead of "over a quarter of a million" (employees). But we are now able to reproduce some of the drawings of the fine new building in which it is proposed to house and instruct the 50 members of the railway staff under training at any one time; these and full details of the scheme will be found on page 809. It may be added, however, that the college will be open to all who are likely to profit by the training, whatever their ranks or grades, and the method of selection will probably be as follows. District officers will recommend promising men from all branches of railway work, who will then go before a board in London; this board will select those considered most suitable, both mentally and physically. Members of the staff will draw ordinary pay whilst under training and, if space permits, they will be able to return to the college in later years for refresher courses. It may even be found possible, now and again, to fill the college

for a fortnight's course, with some of the 4,000 women employees of the company. Should the scheme prove successful, other colleges may be opened in Scotland and elsewhere, and we may look forward to a flourishing crop of these institutions springing up throughout the L.M.S.R. system.

* * * *

The Minister of Transport

If energy and initiative are qualifications for governmental preferment, the recent invitation extended by the Prime Minister to Mr. Hore Belisha, the Minister of Transport, to join the Cabinet is a well-deserved and long-expected advancement. It would have been more satisfactory to the transport industry, however, had the advancement been accorded before this to the department instead of now to the minister. That, however, may be rectified for the future as a consequence of Mr. Belisha's elevation, as it is unlikely that he will fail to impress the Cabinet with the growing national importance of transport. It was to be regretted that after the precedent of including the Minister of Transport in the Cabinet had been established in the case of Sir Eric Geddes, the first minister, and later in that of Mr. Herbert Morrison, subsequent ministers, including Sir John Pybus and Mr. Oliver Stanley, were not included in the Cabinet. The relegation of the Ministry at the time of the formation of the National Government occurred, moreover, when the London Passenger Transport Bill was going through its final and most vital stages. The constitution of the Cabinet is purposely lacking in rigidity to meet the variation in the representation of departments in varying circumstances.

* * * *

The Week's Traffics

At this time a year ago coal traffics of the four group companies were swollen by fears of a coal strike, and this mainly accounts for the small increase of £52,000 shown by the four companies together for the past week. For the previous week the combined increase was £88,000. Total traffics of the four companies to date aggregate £135,442,000, an advance of £4,368,000, or 3.33 per cent. In passenger train receipts for the 45 weeks the L.M.S.R. has an increase of £558,000, or 2.53 per cent., the L.N.E.R. one of £312,000, or 2.17 per cent., the Great Western one of £178,000, or 1.90 per cent., and the Southern one of £266,000, or 1.94 per cent. The best showing in merchandise earnings is made by the L.M.S.R.

	45th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	+ 18,000	+ 28,000	- 9,000	+ 37,000	+ 2,175,000	+ 4.13
L.N.E.R. ..	+ 12,000	+ 4,000	- 15,000	+ 1,000	+ 1,248,000	+ 3.24
G.W.R. ..	+ 11,000	+ 12,000	- 13,000	+ 10,000	+ 585,000	+ 2.65
S.R. ..	+ 8,000	+ 1,000	- 5,000	+ 4,000	+ 360,000	+ 2.02

The Great Northern Railway (Ireland) has to date a gain of £20,600 from passengers and of £2,200 from goods, and the Great Southern £52,245 and £116,361.

* * * *

Gold Coast Railway

A total length of 500 miles of the Gold Coast Railway—all on the 3 ft. 6 in. gauge except the Accra-Weija 2 ft. 6 in. branch of 10 miles—was open during the financial year ended March 31, 1936. For the first time since 1929-30 it earned a surplus above working and overhead costs, including the full provision of £124,375 (against £80,000) for renewals. The cocoa crop exceeded expectations and was marketed at higher prices, the export of manganese ore improved, and activity in the gold

mining industry brought traffic in imported machinery, &c. Improved trade conditions resulted in a greater movement of general traffic, encouraged by a judicious reduction in rates and fares. Cocoa brought in 40 per cent. of the total goods revenue, and gave an increase in receipts of 11.29 per cent.

	1935-36	1934-35
Passengers	3,101,425	1,822,093
Goods, tons	911,709	729,887
Paying train-miles	1,148,786	996,318
Operating ratio, excluding renewals	42.41 per cent.	50.27 per cent.
Gross earnings	£1,000,336	810,740
Expenditure (including renewals)	548,641	487,530
Net earnings	451,695	323,210
Loan charges and sinking fund	415,712	471,359
Surplus (+) or deficit (-) ..	+35,983	-148,149

Ordinary working expenditure was only £16,736 above that of 1934-35, and the increase was wholly attributable to the additional train miles required for the heavier traffic. An index of efficiency is introduced with the report.

* * * *

How Stockholders Can Help the Railways

Several times in his speech at the luncheon of the British Railway Stockholders Union last Wednesday (see page 811), Sir Robert Horne, Chairman of the Great Western Railway, emphasised the community of interest that exists between the boards of railway companies and the stockholders. Even where there is divergence in the approach to matters of policy, the motives actuating both sides are the same. But he did not ask stockholders merely to adopt a passive acceptance of what the railway boards did for them. They, too, could be active in the common interest by spreading far and wide knowledge of and sympathy with the case for the railways. By reason of their numbers, their propaganda would be far more effective than the utmost the railways can expect to do in this direction through their own publicity channels. These views were endorsed by Mr. Leslie Boyce, M.P., who supported the vote of thanks to Sir Robert Horne. There could, he said, hardly be any household removal, annual outing, or other source of possible revenue of which some stockholder was not aware, and by putting forward the claims of the railways for such business, they would be performing a most valuable work.

* * * *

Catching the Public Eye

From time to time we have referred to the excellent work carried out by the Engineer's Department of the North Eastern Area of the L.N.E.R. in beautifying the lineside in various ways, with grass plots neatly edged with concrete, shrubberies, flower-beds, and an all-round attention to tidiness which is a most attractive exchange for the nondescript lineside "furnishings" which so often affront the eye elsewhere. Then there have been for some time past the helpful indications "York—One Mile," and similarly in the neighbourhood of other important stops, prominently displayed by the side of the line, which enable passengers unfamiliar with the route to gather their belongings together in good time before the train stops. Now this business of catching the public eye north of York is finding its expression in still other ways. Where branches leave the main line, large signposts are being erected, at an angle so that they may be clearly read from the main line trains, indicating the district served by the branch. North of Darlington, for example, one of these boards reads, with the direction indicated by an arrow: "To Weardale, Teesdale, and the Lake District." This helps to remind the public that the railway is the best means

of getting anywhere, or, at any rate, that the railway administration thinks so.

* * * *

Indian Railways and the Reforms

Railways are often of vital importance to a country either commercially or strategically, but never before has the ability of its railways to provide a surplus been the deciding factor, as between success or failure, in the administration of a sub-continent containing 350 million inhabitants. Of paramount importance in the working of the reforms embodied in the Government of India Act, 1935, is the solvency of the Provinces, and this can be assured only by substantial contributions from the Central Government; it is upon a net profit from its railways that the Government has to rely for the adequacy of these contributions. As there is at present a deficit upon the working of the State-owned lines, and as uneasiness with regard to their financial position is expressed in the reports of Sir Otto Niemeyer and the Indian Public Accounts Committee, the Government of India has appointed the committee of inquiry announced in our issue of October 23. It is not so much in internal efficiency that the committee will have to recommend improvement, as there are few systems in the world that have so low an operating ratio as the 54.7 of the Indian lines, a figure due partly to an annual saving of £4,875,000 effected during the last four years. A curtailment of staff by 114,000, a great reduction in stores balances, and widespread economies resultant from the recommendations of the Pope Committee reports have all contributed to the present figure, though Indian systems were always economically worked, and not very much greater savings can be hoped for in this direction.

* * * *

Railway Committee of Enquiry in India

It is probable that the committee will have to look rather to external fields to produce an immediate surplus profit, and one of the most fertile of these is an overhaul of road transport. This, it seems, can be brought about only by the insistence of the Central Government upon a thorough revision of and control over the road transport policies of the Provinces, possibly by the appointment of a Minister of Transport with powers over them akin to those of the corresponding Minister in this country over the areas under him and over local authorities. With road transport developing rapidly and promiscuously some such action is necessary to improve the financial condition of the railways. Another source of possible additional revenue is dependent upon that vexed question, the reform of the rates structure. Difficult enough in a homogeneous European country, this problem is infinitely more complicated in India, by its vastness and by the multitude of languages, creeds, castes, communities and commercial interests concerned; also by the fact that conditions vary considerably in the different areas served by the same railway. Where 90 per cent. of the population is dependent upon seasonal variations of rainfall and crops, supply and demand change rapidly, affecting both indigenous products and imports, and further complicating the situation. In the short time at his disposal the rates advisor to the committee will, therefore, have a wide area to cover, but doubtless the recommendations of the committee in this as in other directions will greatly benefit Indian railway administration, and its report will be awaited with more than ordinary interest.

* * * *

Railway Grouping in the United States

In a recent editorial note (published on page 684 of our issue of October 30) we referred to the existing

"short line" railways in the U.S.A. These are, of course, mainly the survivors of a system of railway construction by small companies, and subsequent voluntary grouping, that developed in America on similar lines to those in Great Britain. It has been estimated that at one time there were more than 8,000 of these short line railways, and that upwards of 6,500 have been consolidated into the present great systems of the United States. It is interesting to recall that, when Abraham Lincoln was a Member of the House of Representatives, in 1848, and had occasion to travel from Washington to Massachusetts to deliver some campaign addresses, he found it necessary to use three different railways between Philadelphia and Jersey City; these are now parts of the Pennsylvania Railroad. Later, when he was returning from Springfield, Illinois, and travelled between Albany and Buffalo, he had to use seven separate railways, all of which are now included in the New York Central System. Indeed, the modern Pennsylvania Railroad organisation includes more than 600 independently built and operated pioneer short line railways, and the New York Central system over 400. The Baltimore & Ohio Railroad had acquired upwards of 250, and practically every U.S.A. railroad has absorbed some in the course of its development.

* * * *

New Standards of Locomotive Performance

In his presidential address to the Institute of Mechanical Engineers, reviewed briefly in our issue of October 30, Sir Nigel Gresley devoted attention to the successful working of the L.N.E.R. Silver Jubilee express, and added interest is thereby lent to the detailed description which appears on page 805 of this issue of the working of one of the streamlined Pacifics on this service. The occasion was August 27, when the dynamometer car was included in the train, and its tare weight thus raised to 254 in place of the usual 220 tons. By comparison with the 113 m.p.h. reached on the up journey of the same day, speed going north was rigidly restricted to a maximum of 90 m.p.h., and scrupulous care was devoted to service slacks, of which twelve in all, of varying severity, were made. The most remarkable feature of the locomotive working is seen from the tabulated details of the running to be the close correspondence of boiler and steam chest pressures whenever the regulator was fully open; the drop in pressure from boiler to steam chest varied mostly from 15 lb. down to *nil*, and 5 to 10 lb. may be regarded as an average figure. This represents a loss of 2 to 4 per cent. only in pressure as compared with the 15 per cent. generally assumed in the tractive force formula. To make the entire journey, save on starting and recovering from slacks, on 18 per cent. cut-off, including an average speed of over 81 m.p.h. up the whole of the long incline from Tallington, and a minimum of 75 m.p.h. over Stoke Summit, adds yet another feat to those which Sir Nigel has jointly described as unprecedented, in this country.

* * * *

The Detroit Arrow

Despite the competition of electricity and diesel propulsion, the Pennsylvania Railroad still relies on steam for the operation of some of the fastest railway schedules in the world, and carries them into effect without any help from the streamlining of either locomotives or rolling stock, both of which are of standard types. Acceleration this winter of the Detroit Arrow has made that extremely fast train faster still. The time for the entire journey of 294.5 miles between Chicago and Detroit has been cut to 4½ hr. in each direction, including three intermediate stops eastbound and four westbound. But 146.5 miles of the journey—roughly one-half—are over Wabash metals,

where speed restrictions limit the overall average to a little under a mile-a-minute, and the Pennsylvania is responsible for making up the deficiency. This it does by running the 140.9 miles from Englewood, in the eastern suburbs of Chicago, to Fort Wayne in 115 min., at a start-to-stop average of 73.5 m.p.h., on the eastbound journey. But westbound a stop is imposed at Gary, and the 122.4 miles from Fort Wayne to Gary are booked to be covered in the remarkable time of 98 min., at 74.9 m.p.h., at present the fastest steam-operated run in the world; this is followed by a tight start-to-stop timing of 17 min. for the 18.5 miles from Gary to Englewood. In the westbound direction, including the slower running over the Wabash, the running time of 275 min. for 294.5 miles entails an average of 64.3 m.p.h. throughout.

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P.L.M. Cab Signal Improvements

In common with the other French railways, the P.L.M. uses recording speed indicators of the Flaman type in combination with ramp contact cab signal apparatus and driver's vigilance handle. The maintenance of these appliances requires special staff, both for the locomotive and track equipments. Particular attention has been paid to improving their performance during the last few years. At the Rome (1922) and Cairo (1933) International Railway Congresses, the question of cab signal failures was discussed, and some of the figures cited indicated that much remained to be done in this respect by some of the French administrations. In 1933 the number of failures on the P.L.M. was given as 3.7 per 1,000 signals passed in the "on" position, but this had been reduced last year to 1.03 per 1,000, and doubtless will fall still lower. It is difficult to believe, however, that failures can ever be quite eliminated with an open circuit system. To enable the track apparatus to be easily and regularly tested, a van has been fitted with a set of locomotive mechanism and some measuring instruments. It is attached to the rear of a train, and as the outer and warning disc signals are all replaced as the locomotive passes over the Aubine treadle a few yards in advance of them, the van apparatus should receive a danger warning from every ramp, which enables the working to be checked accurately.

* * * *

High Speeds and Safety

Mr. W. J. Patterson, a Director of the Bureau of Safety, Interstate Commerce Commission, writing in the pages of the *Railway Age*, expresses himself strongly on the subject of high speeds and the safety factor. One of the first and most fundamental of all safety considerations is the ability to stop in reasonable time and distance, and therefore from the standpoint of safety, brakes are far more important than motive power. With increased speed there are alternatives, either stopping distances must be increased, or stopping appliances made more effective. At speeds in the neighbourhood of 100 m.p.h., "signals flash by," says Mr. Patterson, "in rapid succession," and if fast schedules are to be maintained in storm or fog when the enginemen's view of wayside signals is obscured, provision must be made for displaying signal indications in the cab, or for automatic control of the train in case a driver fails to see and over-runs a restrictive signal indication. It requires a full mile and a half to stop some of the high speed trains today, and that in itself is sufficient to demonstrate the utter futility of depending merely upon the vision of the engineman to detect an abnormal condition of the track ahead in time to take effective action. The record to date of complete safety in the operation of high speed trains is a reassurance that the precautions Mr. Patterson describes have not been neglected.

Irish Free State Railways in 1935

THE railway returns recently published by the Irish Free State Government for the year 1935 cover the railways wholly in the Free State and those partly in the Free State and partly in Northern Ireland. The only railway operating undertaking lying wholly in the Free State is that of the Great Southern Railways Company, with a route mileage owned of 1,955 miles 51 chains, in addition to 120 miles 20 chains leased or worked, including the Irish lines of the Fishguard & Rosslare Railways & Harbours Company, 104 miles, and certain colliery lines. At the end of 1935, the total single track owned including sidings was 2,527 miles 52 chains. Route mileage owned in 1934 was 2,037 miles 73 chains, and total track mileage 2,616 miles 31 chains. Difference in route mileage in the two years is accounted for by the closing of two 5 ft. 3 in. gauge sections: Galway—Clifden 48 miles 7 chains, and Ballina—Killala 7 miles 50 chains; and of the 3 ft. gauge lines, Cork, Coachford, Blarney, and Donoughmore, 26 miles 45 chains. For the railways wholly in the Free State the financial tables and certain of the statistical returns are based on those given in the Great Southern Railways Company's annual report, but they are supplemented in the Government return by detailed operating statistics. A similar procedure is adopted with the Great Northern Railway which, according to the return, had in 1935 a route mileage of 224 miles 57 chains of 5 ft. 3 in. gaugeline in the Free State and of 327 miles 26 chains in Northern Ireland. This shows a total of 10 miles 8 chains less than in 1934, and is accounted for by the closing of the Keady—Castleblaney line, of which 4 miles 79 chains were in the Free State and 5 miles 9 chains in Northern Ireland. The Great Northern Railway, as the map attached to its 1935 report indicates, has also closed the railway of 8½ miles between Armagh and Markethill, although the section appears not yet to have been technically abandoned since it is still shown in the mileage table.

For the other railways situate in both territories the data are grouped together, and the further operating statistics for these railways are not yet available. They include the County Donegal Joint Railways 90 miles 71 chains; Londonderry & Lough Swilly 82 miles 40 chains; Sligo, Leitrim & Northern Counties 43 miles 21 chains; and Dundalk, Newry & Greenore 26 miles 68 chains. In the official returns there is no change shown for 1935 in these mileages, although the report of the Londonderry & Lough Swilly Railway Company for the year 1935 states that the rail service on the Buncrana—Carndonagh extension of 18½ miles was withdrawn on December 2, 1935. The map attached to the report, however, shows this extension as still in existence.

Gross railway receipts of the Great Southern Company for 1935 exceeded those for 1934 by £147,538, or 4·86 per cent., and the expenses by £66,852, or 2·46 per cent. On the Great Northern the increase in railway gross receipts was £66,497, or 6·96 per cent., and in expenses £26,435, or 2·80 per cent. "Other railways" increased their railway receipts by £7,281, or 8·61 per cent., but reduced their expenses by £1,773, or 1·50 per cent. These other railways had, however, a total net income all told of only £5,000, and their rentals, fixed charges, &c., exceeded this by over £5,000. Results from ancillary businesses were better in 1935 on both the Great Southern

and the Great Northern Railways. In the case of the Great Southern the road transport profit of £80,394 in 1934 increased to £86,707 in 1935, and on the Great Northern the loss of £8,318 in 1934 was converted into a profit of £8,438 in 1935, although its fleet of road vehicles in Northern Ireland was taken over by the Northern Ireland Transport Board on October 1, 1935. Under the description "petrol, oil, and steam rail motors" the mileage run on the Great Northern Railway increased from 103,190 miles in 1934 to 227,302 miles in 1935, and on "other railways" from 250,451 miles to 352,603 miles. The accompanying table gives some operating results for the past two years.

Increased receipts under all the main headings of goods traffic were shown in 1935, except for a small decrease in coal on "other railways." Livestock receipts on the Great Southern improved by £49,604, or 19·95 per cent.,

	1935			1934		
	Great Southern Railways	Railways partly in Free State	Other	Great Southern Railways	Railways partly in Free State	Other
		Great Northern	Railways		Great Northern	Railways
Passenger journeys	10,278,094	5,326,530	570,719	8,565,000	4,746,795	506,739
Goods, tons	2,650,754	801,000	161,895	2,473,637	771,832	159,124
Average haul, miles	64·06	52·58	—	65·76	51·52	—
Train-miles	9,322,314	3,676,645	758,036	9,103,080	3,475,463	679,570
Operating ratio, per cent.	87·85	92·56	121·50	89·97	96·02	133·84
	£	£	£	£	£	£
Passenger train receipts	1,278,096	544,855	31,576	1,247,958	520,630	27,697
Goods train receipts	1,880,604	494,280	63,148	1,763,219	453,958	59,388
Gross railway receipts	3,180,704	1,059,799	98,613	3,033,166	993,302	90,792
Railway expenditure	2,786,698	971,741	116,435	2,719,846	945,306	118,208
Railway net receipts	394,006	88,058	Dr. 17,822	313,320	47,996	Dr. 27,416

and on the Great Northern by £12,959, or 16·60 per cent. Each railway showed an increase in the average train-load, and the average wagon-load on the Great Northern increased from 3·02 tons to 3·15 tons, but that on the Great Southern fell from 3·52 tons to 3·47 tons. The number of passenger licences granted under the Road Transport Act, 1932, and under which road passenger services were operated in the Free State during 1935 by railway companies amounted to 791, of which the Great Southern operated 562, the Great Northern 211, and the Londonderry & Lough Swilly 18. These figures represent decreases of 3 and 7 respectively for the Great Southern and the Great Northern. The numbers of merchandise road licences compulsorily transferred in 1935, under the Road Transport Act, 1933, were 191 to the Great Southern, 78 to the Great Northern, 48 to the Londonderry & Lough Swilly, and 6 to the County Donegal Railways. In addition voluntary transfers of licences from independent operators were arranged as follows:—To the Great Southern 11, the Great Northern 4, the Londonderry & Lough Swilly 6, and the County Donegal Railways 7.

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Entre Rios Railways

ADVERSE conditions seriously affecting the wheat and linseed harvests were the principal cause of the decrease of £98,326, or 10·4 per cent., in the receipts of the Entre Rios Railways for the year ended June 30, 1936. In the working expenses there was a decrease of £10,398, or 1·4 per cent., and net receipts were £87,928 lower. Exchange differences were, however, reduced from £85,038 to £30,686 largely on account of the agreement with the Government for an improvement of 5 per cent. in the remittance rate, which prevailed during the second half of the financial year. As it is not yet possible for the company to effect payment of the arrears of debenture interest accrued under the moratorium, the special committee has

extended the moratorium until July 1, 1937, as authorised by the debenture holders. The result of the year's operations is a debit balance of £147,399, making a total debit balance to be carried forward of £280,091. Some operating figures are:—

	1935-36	1934-35
Passengers	343,815	308,857
Public goods, tons .. .	671,252	785,681
Ton-km. (goods and live-stock) 233,279,394	245,776,194	
Average haul, km. .. .	299.8	263.7
Operating ratio, per cent. ..	88.35	80.24
Passenger receipts	152,243	154,406
Public goods receipts .. .	473,661	534,466
Gross receipts	844,366	942,692
Working expenses	746,008	756,406
Net receipts	98,358	186,286

Long distance passenger traffic suffered from the conditions caused by crop disappointments, but the popularity of excursion trains was well maintained. Parcels traffic was appreciably heavier and brought in £82,652, an increase of 6.8 per cent. This was mainly due to larger poultry consignments to Buenos Aires, and to the building up of a promising trade, through Buenos Aires, in fruit and vegetables from the Rio Negro district and other producing zones to Entre Rios and Corrientes. Receipts from all cereals fell from £150,428 to £79,465, but oranges and tangerines brought in £19,446 more. As a result of the special facilities offered to loaders in Concordia the company has carried nearly the whole of the important fruit traffic from Concordia to Buenos Aires.

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Signalling at Waterloo

THE first Waterloo station was opened on July 11, 1848, some ten years after the opening of the first section of the London & Southampton Railway, which until that date terminated at Nine Elms. In 1862 the extension known as the Windsor line station was added; in 1879 the South station; and in 1885 the North, forming a collection of lines and platforms amid which the traveller often found it far from easy to discover his way. Prior to 1867 there was very little signalling. The points in the yard were worked by hand levers and there was a ground hut outside, to stop incoming trains when necessary at a signal near the Westminster Bridge Road, for which a distant signal was provided about 400 yd. in rear. A few disc signals of Martin's design had been gradually provided, worked from the platforms to advise the hutman what to do, he in turn intimating by means of a mechanical gong what train required to come in. Locomotives were uncoupled outside and the trains roped into the terminal lines. During this period traffic increased until at times some 220 trains were dealt with daily. In March, 1867, a signal box, called the "A" box, a name which has lasted until the recent change, described on page 794 in this issue, was constructed on girders across the lines by Stevens & Sons, the first firm to manufacture railway signals regularly in Great Britain and long associated with that class of work on the L.S.W.R. It had two frames placed parallel to the rails, of 24 main and 23 Windsor line levers, and a 4-unit stirrup frame. The box carried two six-armed iron semaphore signals. In 1874 Saxby & Farmer provided a new "A" box of 109 levers in one row, at right angles to the rails. Four years later this was enlarged by Stevens & Sons building a new shell round it, removing the old and adding 35 levers parallel to the 109. In 1880 20 more levers were added and 65 in 1885, a total of 209 in two parallel rows. This box sufficed until the extensive widening works a few years later made it necessary to increase the signalling facilities, as all the lines

leading to the platform bays were completely re-arranged. It was found impossible to add levers to the existing box, so a new one was built alongside and north of it, complete in every respect before the transfer, beginning on May 1, 1892, was made in three stages. This was the "A" box which was superseded by a power box on October 18 last, and it marked the last stage of the mechanical signalling era at Waterloo. It was indisputably one of the most interesting and remarkable examples of mechanical signal engineering ever constructed, and the combination with it of a number of electrical devices, involving some novel arrangements of working, added to its importance.

Limitations of space made it necessary to find means of reducing the number of levers, which, according to some estimates, would have been about 400 or so, if usual methods had been followed. The number finally arrived at was 236, in two parallel rows, the signalmen standing between them, and was made possible by the use of the Simplex lever saving mechanism, with the invention of which the late J. P. O'Donnell was associated. By means of so-called gear levers, of which there were 7, capable of taking up three positions, 102 levers sufficed to operate 247 signal connections, 72 of them being given multiple functions. This apparatus was not quite worked to capacity. There were in addition 50 levers operating 81 points, 46 facing point lock levers, 15 spare, and 16 so-called setting levers, used to change the locking in connection with signals reading over alternative routes. It will be obvious that such concentrated working involved a large amount of interlocking, much of it conditional. The direct tappet system, which originated with James Deakin, of Stevens & Sons, was adopted, with a 51-channel locking box between the frames, the tappets from the levers in which were superposed, and a 40-channel box outside each frame, with tappets from that frame only. Thus each lever could act on 91 locking channels. Many special devices were contrived for the work by Mr. W. F. Burleigh, who directed it for the makers.

In accordance with the practice popular in the early days of signalling, the principal signals were grouped on a large lattice gantry over the box, which had 61 arms, with 6 more on the girder below the box. How anybody managed to see them in a bad fog remains a mystery. The platforms had starting and shunt-out signals, to right and wrong roads, and home signals operating to three positions, to indicate whether the road was clear to the buffers or partly occupied; electric fouling bars at intervals controlled the stroke imparted to the arms, which were worked from three small yard boxes close in, and preceded those on the main gantry. This three-position working was given up in after years. W. R. Sykes' hammer type reverser, or "banjo," was applied to the advanced starting signals, and his signal selector to the dual working of certain in-shunting signals, to create a separate section for engine reversals west of the box, while his lock-and-block, which was replacing the Preece block telegraph in the London district, was specially adapted to cover the terminal working and shunting. Repeaters were applied to practically all signals, and there were 250 electric circuits entering the cabin, for which over 680 primary cells were used. The confined space necessitated double-tier point rodding and overhead signal wires. Another interesting feature was the holding of the road ahead of a train after a signal was restored until a facing-point lock, about mid-way on the route, had been manipulated.

As time went on and the station layout was altered and new approach lines built—there are now 8 against the 6 of 1892—the "A" box necessarily underwent a good deal of alteration. Levers were added, and the final total was 266, exclusive of 4 setting levers. The signals were also considerably re-arranged. Route indi-

cators for incoming moves, and signal machines, enabled the imposing gantry to be gradually abolished, while track circuits at length made their appearance. The mechanical locking underwent many modifications and even at the end of its life much careful work had to be done on it to cover the period from the introduction of the Wimbledon flyover, with the consequent transposal of up main local and down main through lines, to the inauguration of the power working. As far back as 1900 Sir Sam Fay, after returning from the United States, spoke of power signalling for Waterloo in a press interview, in which he announced the intention

to instal pneumatic signalling at various points on the L.S.W.R., and observed he was certain that "we are approaching a complete revolution all the way round in our system of signalling . . . Before we are much older we shall see all our intermediate signal boxes worked automatically." Although power signalling made its appearance at Clapham Junction some ten years later, muscular force continued to reign at Waterloo. Its disappearance was, of course, only a question of time, and now the familiar "A" box which has so long protected the traveller with a remarkable degree of efficiency, is at last silent.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

High Speed Junctions

Chief Engineer's Office, L.M.S.R.,
St. Pancras Chambers, London.

November 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I regret to find that whilst Mr. Peters' letter is severely critical of the two-level junction, it contains no constructive remarks. No claim was made for a no-limit junction but simply that a definite step forward towards this aim had been achieved. He says that I support my claim by invoking apparently unorthodox principles, and here I must disagree with him. Unorthodox principles, no! Unorthodox methods, yes!

An explanation of the "loose terminology" is found in the Hallade Handbook* issued by the L.M.S., and a copy of same has been forwarded to Mr. Peters, who need have no fear that the fact that the thrust due to centrifugal force varies with the square of the velocity or that discomfort varies with the cube of the velocity was either unknown or neglected.

The reference to the motor car with fixed steering and solid axle seems irrelevant, as it affords no comparison to the mechanics of a locomotive or curved track. The considerable violence of push he refers to would mainly be necessary to overcome the friction between tyres and road. Of course, there is a force required to deflect the locomotive from the straight path, but rather more is known of its measure than Mr. Peters suggests. In the main it is this "curving" force which at speeds in the region of $17\sqrt{R}$ causes the wheels to mount the rail, but only negligent reasoning would place this force in the category of "the most important."

It is absurd for Mr. Peters to say that two-level chairs and increased speed have little or nothing to do with one another. Does he mean to suggest that cant has no bearing on permissible speed? We are all so accustomed to hear that cant has little effect upon safety that we are apt to place too little importance on its adjustment. With most locomotives of today the overturning speed is approximately $21\sqrt{R}$ with no cant and $22\sqrt{R}$ with 6 in. of cant, and the critical speed for rail mounting, as stated previously, is in the region of $17\sqrt{R}$. Cant within the limits of 6 in. makes little difference to these speeds, so from a safety point of view cant does not play an important part. As the cant required for a speed of $17\sqrt{R}$ is 17 in., the cant deficiency at the critical rail mounting speed would be at the least 11 or 12 in.

Apart from passenger discomfort, which in spite of Mr. Peters we cannot afford to neglect, excessive deficiency in cant causes endless trouble with maintenance, and because of these factors it is strictly limited to a predetermined amount. I am not prepared to enter into a discussion as to its exact

maximum value, but assuming it at $2\frac{1}{2}$ in. it means that even with 6 in. of cant, speed is in consequence limited to $12\sqrt{R}$. So unless both the comfort of passenger and the detrimental effect of excessive cant deficiency are to be neglected, speed is limited by cant. Centrifugal thrust is, therefore, the controlling factor, not the curving thrust.

I am well aware that both over-canting and under-canting cause excessive side wear of the high rail. The fact has been demonstrated time and time again, and I fail to see that any trick reasoning is necessary for its explanation. In the case of under-canting it is readily understandable, but in the case of over-canting the relief of weight from the outer wheels permits the curving force to become the dominant factor and the wheel to ride up the coning, thus causing excessive "flange rub." With correct cant and the consequent correct weight on the wheel, the effect of the curving force is minimised and perhaps Mr. Peters would not object to the statement that careful adjustment of the cant to the speed requirements results in the reduction of the side wear to the very minimum. Curving force is always there but whether or not it is the predominant force is dependent on cant, curvature and speed.

Mr. Peters ridicules the idea of a transitioned switch, yet in the early part of his letter he states "should not the acceleration [of curvature] and its rate of changing be considered." The transitioned switch would of necessity have more heel chairs and therefore a longer length in which this "fixed departure" is controlled. I do not shrink from admitting that the switch and crossing are the weakest part of the junction, but their presence need not always govern speeds as he would have us believe.

He says I should compare the long D switch with an E and that no elaborate diagram is necessary to prove an E's superiority to a D. Wrong again! Long D is still a D, D chairs, D turnout, D radius, D crossing and D lead + 5 ft., the only one essential difference is it possesses E ease in making the initial departure from the stock rail and would be, and is used when circumstances demand the D turnout.

With regard to Barassie Junction (Figs. 8 and 9, page 579, THE RAILWAY GAZETTE of October 9), it was hoped the photographs would be self-explanatory especially with the aid of the notes on the layout. In the bottom photograph surely the gentle take-off from the straight can be appreciated as can the transitioned curve up to the crossing, and in the top photograph the reduction of the curvature through the diamond. Look at this photograph from the bottom left hand corner and the excellence of the alignment can be seen.

In one respect Mr. Peters is right. Yes, we shall still have our two-level chairs and transitional leads, and because of them we shall also have higher permissible speeds through our junctions—higher speeds with increased comfort and safety, and that last word I'll leave him to think over.

Yours faithfully,

W. M. BOND

* This was the subject of a notice in THE RAILWAY GAZETTE of December 21, 1934 (page 1013).

PUBLICATIONS RECEIVED

The Railways' Athletic Association Official Year Book, 1935-36. 5½ in. × 8½ in. 306 pp. Price 1s.—The development of the Railways' Athletic Association is well stressed in the foreword of its latest year-book by Sir Herbert A. Walker, President of the R.A.A., when he mentions that in 1928 the number of pages necessary to chronicle the activities of the association in the annual report was 82, whereas now nearly four times that number of pages are essential. Sir Herbert A. Walker concludes by saying: "I know that the activities of the association are followed with enthusiasm by the directors, officers, and members of the staff of all railways, and sincerely hope that this knowledge, coupled with the support of the members of the association, will afford a very real encouragement to all associated with it." As in previous years the early pages of the year-book are devoted to portraits making up a picture gallery of railway officers who are also Vice-Presidents of the association. The Hon. General Secretary, in his observations on the ninth session, reports a successful year. The various championships and other competitions were well patronised by members of the affiliated associations and clubs, entries being received from all parts of the country. In order to give the provincial railway staffs a better opportunity of participating, the General Committee continued its policy of staging some of the events outside the metropolis, such as the annual sports meeting held at Earlstown, bowls championship at York, road-walking championships at Leicester, North versus South football match in Liverpool, and athletic contests versus the French railway teams at Ashford, Kent. Reference is also made to the committee's appreciation of the financial and active support afforded the association by the President and the Vice-Presidents. The annual dinner was again a prominent function of the year. Following the report come some 130 pages, giving details of the activities and personnel of the various groups affiliated to the association covering a very wide range of sport and interest and showing what good service the R.A.A. is doing to maintain the health and well-being of the employees throughout the railway industry. The address of the Honorary General Secretary, Mr. P. W. Holdaway, is 36, Grove Road, Thornton Heath.

Henschel Hefte No. 11: September, 1936. Kassel: Henschel & Sohn A.G., 11½ in. × 8½ in. 96 pp. Illustrated.—The appearance of a fresh issue of this valuable publication is always a matter for satisfaction, and the present number fully maintains the pictorial excellence and technical quality of its predecessors. To prevent confusion it should be noted that a new serial numbering has been introduced; the preceding locomotive issue (December, 1935) was No. 5, and the present

issue is No. 11 to allow for the fact that five of the ten earlier *Hefte* were road vehicle issues. On September 1, 1936, Henschel locomotive No. 23,000 was completed in the Kassel shops (No. 1 was completed in 1848), and as an indication of the revival of activity in Germany it is interesting to note that orders for the last thousand Henschel locomotives were obtained in 3 years, compared with 5 years for the preceding thousand. Appropriately enough, the new issue of the *Hefte* begins with an illustrated review of Henschel locomotives built for the South African Railways during the past 15 years, followed by an article by Obering W. Böhmig on some of the latest locomotives built for South Africa, Brazil, Chile, China, and Latvia. The double-deck streamline train of the Lübeck-Büchener Railway Company is dealt with fully by Baurat Mauck and Obering. Heise, and the next technical article is by Dipl.-Ing. P. H. Bangert on the relation between adhesive weight and tractive effort. Two other articles of special interest are contributed respectively by Obering R. O. Roosen on operating experience in the cylinder lubrication of Henschel high-pressure steam railcar engines, and Dr.-Ing. Kurt Ewald on factors influencing the development of high-speed steam locomotives. An instructive review of the evolution of Prussian and standard German passenger locomotives from 1877 up to the present time appears under the name of Rudolf Kreutzer, and the issue concludes with photographs and general arrangement drawings of 25 new Henschel locomotives of many different types for many different countries, supplemented by tabulated dimensions. Special reference must be made to several admirable sets of photographs, namely, Dipl.-Ing. Hans von Gonthard's pictures from the Far East, a collection of German railway scenes, and Direktor J. S. Walter Hardebeck's travel photographs, mostly South African.

"High Speed Steels" and "Carbon Tool Steels."—The acknowledged competence of Edgar Allen & Co. Ltd., Imperial Steelworks, Sheffield 9, in the production of all classes of high speed and tool steels is well reflected in two booklets recently issued by this firm under the above titles. The technique of manufacture of these special steels has greatly advanced by the use of the maker's high frequency electric furnace, which was the first of its kind in the world to produce high quality tool steel on a commercial basis. The heat is induced directly in the metal itself by means of eddy currents set up by the current circulating outside the crucible, and not only does the violent electric stirring of the metal so produced result in a more homogeneous and uniform steel, but there is no risk of contamination from sulphur, phosphorus, or other harmful elements contained in fuel gases or other heat sources in an ordinary

steel furnace. Research has proved that the high frequency electric furnace provides a most delicate control over all the elements contained in the steel leading to exactness and consistency in the finished quality. "High Speed Steels" is devoted to Edgar Allen's Stag Major, Stag Extra Special, Stag Special, and Stag Air-hardening steels; details of tests on each are given, followed by useful notes on forging, annealing, hardening, and grinding of tools. "Carbon Tool Steels" is similarly informative in regard to ordinary tool steels, and in particular stresses the need of careful choice of the six different grades of hardness according to the work that the tool is to be called on to perform.

Corsica.—A very readable illustrated booklet on the attractions of Corsica has been issued by the P.L.M. Railway. The island is, of course, excellently served by the railway company's motorcoach routes, and of her tours in these vehicles the author, Miss Eleanor Elsner, writes with enthusiasm and charm. Her descriptions include much historical allusion, while she does not forget to give a picture of the Corsican people of today—their hospitable generosity and kindness to the visitor. He who thinks of Corsica only in terms of implacable vendettas, and an impenetrable interior where a bandit lurks behind every shrub, will be pleasantly relieved by the gracious and alluring picture which Miss Elsner paints of that island which the Greeks knew as *Kalliste*—"the most beautiful."

Excavators.—Details of construction and general specifications of the new Smith Two-Ten excavators are given in an illustrated catalogue published by the makers, Thomas Smith & Sons (Rodley) Limited, Leeds. The buckets are all of ¾ cu. yd. capacity, and there is a choice of three types of power unit—diesel engine, petrol-paraffin engine, or electric motor. The excavators travel on caterpillar tracks each 13½ in. wide and having large springs to absorb sudden shocks in travelling. The ground clearance of 10 in., coupled with the low ground pressure, allows travelling on lumpy surfaces or wallowing in soft ground. An all-welded one-piece steel frame affords a simple and robust foundation for the fully revolving superstructure. The Two-Ten excavator is quickly convertible to act as a navy shovel, skimmer scoop, back-acting trencher, dragline, grab crane, crane, or pile-driver. Only two types of jibs are required for all these attachments.

Aluminium Finishing Processes.—This is a very useful addition to the series of practical handbooks issued by the British Aluminium Co. Ltd., Adelaide House, London, E.C.4. The many uses to which aluminium is now put entail a corresponding variety in the types of finish required, and this publication gives concise instructions on how to obtain them. The processes dealt with are polishing, cleaning, matt finishing, anodising, painting, and enamelling.

THE SCRAP HEAP

An engineer predicts the day when every engine will be oil driven. There's no fuel like an oil fuel!

* * *

BEWARE OF G.A.P.

Mr. Robert Holland-Martin, speaking at the Railway Convalescent Homes dinner (see page 807) on Saturday last, said it was his practice to travel by tube to Waterloo, and therefore he was familiar with the notice "BEWARE OF GAP," warning passengers of the space between the curved platform and the train. It was therefore disconcerting the other day when, observing standing under the notice a somewhat forbidding old lady, his eye descended to her attache case and read the initials—"G.A.P."

* * *

"More and more lines are being electrified," says a report. The steamers are going ohm!

* * *

Residents on the Westholme Farm Estate, Cockfosters, Middlesex, have secured a reduction of £2 in their assessments because of a loudspeaker. The loudspeaker is used in directing the shunting of electric trains between Enfield West and Cockfosters, and the residents complained that the district was wracked night and day by its

strident voice. The Rating Authority agreed the nuisance existed, and said that the London Transport Board had agreed to use the loudspeaker as little as possible.—From the "Daily Herald."

* * *

Asked who invented the postage stamp, a pupil answered "Josiah Stamp." Sir Josiah told me that one the other day; then this: "My son, Maxwell, who is at Cambridge, was asked by a young lady in the University if he was descended from Sir Josiah Stamp. He replied that I was his father, and she answered: 'Oh, I thought he was a character in history, like Disraeli.'"—From "Tit-Bits."

* * *

TRAVEL IN THE CONGO

In Leopoldville station a long all-white train is waiting, ready with its restaurant car and almost-Pullman coaches to get you, in ten hours, to Matadi. No one, while running smoothly and snugly along the 250 miles, passing in review these dozens of doll-stations, smart in their shining bricks and tiles, their miniature gardens, their native stationmasters, dignified and well-uniformed, complete with red cap, with flag and horn, could believe that this Arcadian toyland of today is the same country that half-a-

century ago took Stanley's expedition two years of heroism to cross; nor that this line had taken ten years to build, and several more to rebuild after the war to obtain smoother grades and curves; nor that every single mile of the line has cost half a million francs and more human lives than one dares to count.—Commendatore Attilio Gatti, in "The African World."

* * *

There has recently been an agitation in Fort William over the alleged disturbance caused by trains leaving on Sundays during the time of the evening service. In consequence, Fort William ministers decided at a special meeting to send the following letter to the L.N.E.R. District Superintendent at Queen Street Station, Glasgow:—

"We, the undersigned ministers of Fort William, hereby appeal to the London & North Eastern Railway Company to arrange that no train be permitted to enter or leave Fort William during the hours of Divine service on Sundays, from 6.15 to 7.30. This action is taken because of the disturbances created in the past by Sunday excursionists. We earnestly trust that this appeal will be taken into serious consideration and carried into effect."

The letter was signed by the Rev. S. B. Boys, United Free Church; the Rev. Alexander Maclean, Mackintosh Memorial Church of Scotland; and the Rev. Malcolm Galbraith, Free Church of Scotland.

One Hundred Years Ago

Extracts from the November, 1836, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

On Increasing the Gage [sic] of Railways.—The Great Western Railway Company having announced their intention of increasing, at the suggestion of their engineer, the gage or breadth between the rails above that used by the Liverpool, Birmingham, and other lines, the subject has excited a considerable sensation among railway companies. For it is very evident that if one company adopts one gage and another another, much of the benefits to be expected from this new mode of transit will be entirely destroyed. How is any intercommunication to be kept up? How is it possible that branch lines can be made between the distant parts of great trunks, if they are to use rails of different widths? Are goods, passengers, etc., to be subject to the trouble and delay of unloading, re-loading, and being transferred to different carriages at every change of road, because the parties have thought proper to lay lines of different breadths? As well might the stage-coach be changed every time the horses are changed, or that there is a change of persons in horsing the coach. Where, indeed, will be the boasted utility of rapid conveyance, if the time saved is to be exhausted in changing from one company's line to another's.

Great Western Railway.—We are happy to inform our readers there is no foundation for the rumour that the works of the Great Western Railway have been intercepted by a strike among the workmen. They are proceeding most satisfactorily: no less than two thousand five hundred men are now employed on the contracts between Bristol and Bath. A slight check was given to the works on Wormwood Scrubs, on account of this and the Birmingham, Bristol, and Thames Junction Railway meeting and crossing on the same level, but that also is obviated by an amicable arrangement between the two companies.

The Brighton Railways.—Every party seems to be busily employed, and strengthening himself by all the alliances in his power, like crafty politicians preparing for a desperate struggle. The candidates for the honour of accommodating the Brightonians amount to five: Mr. Stephenson's, Sir John Rennie's, Mr. Mill's (late Cundy's), Mr. Gibb's, and Mr. Provis's, starting from the South-Eastern line at Godstone, we believe. The wisdom of our often iterated recommendation to the Legislature last session, to throw out the lines, that a

better than either would be found, is now most amply verified. Those who maintained last year that they had the *very best* which could be found, now say they have far better, and therefore better than the best. Probably, if they were again thrown out, instead of the comparative superlative, another year would find them the superlative superlative, and the Brightonians would be favoured with such a line as the sun before never shone on.

Greenwich Railway.—This company is now receiving upwards of £50 per diem for traffic, and on Sundays upwards of £150, though passengers have to walk from London Bridge to Bermondsey Street. Fifty pounds per diem make £18,250 per annum, the interest at 4 per cent. of £456,250, nearly the capital of the whole line. Considering passengers have to trudge from London Bridge to Bermondsey Street, and are then set down at Deptford, this may give a tolerable idea of what may be expected when the whole line is opened. "Why is it not opened?" the public repeatedly asks. We have enquired, and we cannot find.

England and Ireland Union Railway.—On Wednesday, October 12, a public meeting was held at the Tolsey, in Gloucester, for taking into consideration promoting a line of railway from Gloucester to Fishguard, or a terminus on the western coast of South Wales.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

EGYPT

Proposed Train Control for Lower Egypt

A scheme for installing train control in Lower Egypt is now under consideration. This scheme provides for a central control office at Tanta, with sub-control offices at Cairo and Gabbary. It is expected that money may be found during the current financial year for this work.

Return of Treaty Signatories

In connection with the signing of the treaty between Great Britain and Egypt, the State Railways arranged to make a general reduction of 50 per cent. on the fares of the three classes of ordinary tickets to Alexandria or to Cairo and back, on the occasion of the return of H.E. the Prime Minister and his colleagues from Europe. This privilege extended three and four days respectively before the dates of arrival of Their Excellencies at Alexandria and Cairo, and the return halves of tickets were available until October 18.

In Execution of the Treaty

In connection with the signing of the Anglo-Egyptian Treaty, the Ministry of Communications has asked the State Railways management for a report on the execution of the military clauses of the treaty in so far as the railways are concerned. The railway administration has just completed this report, which has been submitted to the Minister of Communications for examination.

As the articles of the treaty relative to the improvement of rail communications in the Canal Zone do not specify what improvements are required, it is not yet possible to estimate what amount will be required to give effect thereto. The railway administration has, however, been able to give full details on the project of doubling the line between Tanta and Zaqaiz, the cost of which is estimated at about £E.216,000. The cost of putting the Alexandria—Mersa Matrouh line in good order is estimated at £E.500,000. There is in this report the question of constructing a new line between Tewfikieh and Alexandria to relieve the main line of goods traffic in this congested area, the cost of which is estimated at about £E.500,000.

Accidents

At about 4 p.m. on October 17 as No. 19 express from Cairo to Alexandria was approaching Tukh, a number of Egyptians ran on to the line to cheer the special train of the Prime Minister which had just arrived from Alexandria, with the result that the express dashed into the crowd, killing twelve persons and injuring five others.

Also, on October 14, as No. 2 mixed train, running from Oasis junction to El-Kharga, was descending a 1 in 40 grade and rounding a curve of 115-m. radius, the whole train became derailed; as a result one person was killed and one injured. An enquiry is being held to ascertain the cause of this derailment.

Flood Damage on the Mersa Matrouh Line

On the night of October 20, heavy rain fell between Fuka and Mersa Matrouh, and washouts totalling about 8 km. in length occurred between Abu Haggag and Mersa Matrouh. The approaches to Wadi Naghamish bridge—some 300 to 400 m. of 7-m. high embankment—were carried away and the bridge isolated. Jerawla station was practically destroyed, and the level crossing keeper at km. 282 and his daughter were drowned. Many of the staff lost all they possessed. It is not expected that the line will be ready for traffic before 10 or 15 days.

CANADA

Abandonment of U.S.-Owned Line

Strong opposition has been raised to the abandonment of passenger and freight services over the Fernie branch in British Columbia by the Great Northern Railroad, of U.S.A. This branch was built originally to give the G.N.R.R. access to the Crows Nest coalfield in order to obtain locomotive fuel, but through the increasing use of oil fuel, the railway does not require further coal. The line from Fernie to Michel was abandoned in 1925 and then in 1927 the line from Elko to Fernie was given up as an economy measure, and running powers were obtained over a section of Canadian Pacific tracks. Notice of cancellation of this agreement having been received from the C.P.R., the G.N.R.R. wishes to abandon all service to avoid reopening its own tracks from Elko to Fernie. Counsel for the Provincial Government has described as grossly exaggerated the G.N. claim that it had lost \$1,665,000 since 1925 on an investment of \$4,364,000.

Loss to Road Transport

According to figures placed before the Maritime Board of Trade by the Director of the C.N.R. Bureau of Statistics, the gross freight revenues of the Canadian railways have been reduced by \$38,000,000 a year by the competition of road lorries, and the loss to the net revenue is about \$34,000,000 a year. In his address the Director said that if there was a fair field with no favour, and the road transport undertakings were run under

the same rules of having to accept all traffic offered at the same range of rates, the railways would not suffer, as they could operate at an average economic cost of one cent per ton-mile compared with something like five cents on the road.

N.Y.C. Subsidiaries

A special meeting of New York Central stockholders has been held at Albany, N.Y., to extend for 99 years the leases on two Canadian subsidiaries, the St. Lawrence & Adirondack Railway, owning the line between Malone and Montreal; and the Ottawa & New York Railway, owning the branch between Tupper Lake and Ottawa.

ARGENTINA

A Jubilee on the B.A.G.S.

September 26 was the 50th anniversary of the arrival of the first passenger train at Mar del Plata, the famous South Atlantic summer resort served by the Buenos Ayres Great Southern Railway. To celebrate the event, the company decorated and illuminated the station and entertained representatives of the Provincial Government, the municipal authorities and other public functionaries at a lunch in one of their dining cars, a special programme of outdoor festivities consisting of a theatrical performance, fireworks display and a concert, being arranged by the municipality. Guests invited from Buenos Aires travelled on the previous evening from Plaza Constitución terminus by the 8.15 p.m. train, on which sleeping and dining cars were specially reserved for them. The return journey was made by the night train on the 26th. The railway company arranged for commemorative medals to be struck as souvenirs of the occasion, and also presented a cup to be played for in connection with the local football championship. An interesting feature of the celebrations was the exhibition of the locomotive which hauled the first train to Mar del Plata on September 26, 1886.

Air Passenger Service to Córdoba

A further step in the development of aerial transport within the Republic was taken on October 2, when Pan American-Grace Airways, Inc., inaugurated a passenger, mail and parcels service to the city of Córdoba, 450 miles from Buenos Aires, served by the Central Argentine, Córdoba Central and State Railways. This new service is provided by two of the company's four air liners which operate weekly between Buenos Aires, Medoza, and Santiago de Chile, and which now stop at Córdoba both on the westbound and eastbound trips. The departures from Buenos Aires are on Tuesdays and Fridays, and from Córdoba on Tuesdays and Thursdays; the flying time for the journey between the two cities is 2 hr. 45 min. The machines are of the Douglas type used by Pan American-Grace Airways, Inc.,

for its Pacific Coast services. They are equipped with two Wright-Cyclone motors, of 710 h.p. each, have a speed of 160 m.p.h., and a capacity for 14 passengers and 3 of a crew. The single fare from Buenos Aires to Córdoba or *vice-versa* is \$86.25 paper (approximately equivalent at current exchange rates to £4 17s. 8d.), and from Córdoba to Mendoza or *vice-versa* \$75.00 paper (approximately £4 4s. 11d.). There is a reduction of 10 per cent. on return tickets. The inaugural trip occupied 2½ hr. each way, or 15 min. less than the scheduled time. The passengers included Señor Francisco Gonzalez (Director of Civil Aviation), and a number of press representatives. Breakfast was served on the outward journey.

NEW ZEALAND

South Island Main Trunk Line

Work on the completion of this line [which was referred to in our issue of August 28.—Ed. R.G.] has just been recommenced. The primary objects to be achieved in closing the gap between the two existing sections of line are as follow:—

1. To link up two isolated railway systems with the prospect later on of connecting the North and South Island systems by train ferry if justified.
2. To bring the very fertile province of Marlborough into closer touch with the markets for its primary produce.
3. To provide an alternative route between the South Island stations and Wellington for those who are averse to the longer sea journey via Lyttelton.

The gap which occurs between Wharanui (56 miles south of Picton, the port of the Picton section) and Parnassus (85 miles north of Christchurch), is 76 miles in length. When work was closed down, 28 miles at the north end, and 15 miles at the south end had been in hand (see map below).

Farming Would Benefit

The Fields Superintendent of the Department of Agriculture reporting on the South Island main trunk line states that sheep farming and cattle

raising would benefit considerably from its completion. For though there was room for a greatly increased number of beef cattle in Marlborough, this was impossible without railway facilities, as there was a great loss of stock on the long and difficult journey to Canterbury, and deterioration was most marked. With railway facilities farmers could afford to use lime and fertilisers, and the production of the district would be greatly increased.

The Field Superintendent is also satisfied that the railway would at least pay all expenses and perhaps do a great deal more, provided that all the production of Marlborough for transport south went by rail. He therefore suggests that farmers should be asked to give an undertaking that their stock and produce generally would be sent by train and not by motor lorry, and also that their inward goods would be carried by train. With the assurance of this goods traffic and with a light fast passenger service between Blenheim and Christchurch, the line should, he considers, be on a sound financial footing.

Another Construction

A report from the Public Works Department on the Westport-Inangahua railway states that the work yet to be done comprises completion of from 10 to 27 miles of formation, including some very heavy cuttings and fillings, the clearing of a large number of slips, the construction of eighteen bridges, including those over the Big Cascade, the Buller River and the Inangahua River, and some tunnelling, as well as ballasting, platelaying and the provision of station buildings. The line runs through mountainous country, and the estimated cost of completion is £750,000 and the time three years.

"The question of prospective traffic," concludes the report, "has been referred to the Railway Department, which has made a general survey of the position, and there can be no doubt that a very considerable coal trade with the southern districts will develop, and that large quantities of timber will be railed to Westport and shipped from that port."

FRANCE

Plans for Metro Extensions

Plans for further extensions of the Paris Metro and for co-ordination with existing suburban lines to give direct access to Versailles and Saint Germain are now taking shape. The old Ceinture railway inside the former fortifications will be converted into a Metro line and connected with the rest of the system. In the west of Paris on the left bank of the Seine, the line running from near the Place de la Défense to Issy-Plaine will also be turned over to the Metro. Various Metro extensions will then be connected with this line. The railway from Vincennes to Port Maillot, now being carried on to the Pont de Neuilly, will

be extended on the other side of the river to the Place de la Défense, where connection will be made with the left bank railway. Other extensions to this railway will be from the Porte de Versailles, Pont de Sèvres and Auteuil. Eventually it is hoped that agreement with existing State suburban lines will facilitate the running of Metro expresses through to Saint Germain and Versailles.

SWITZERLAND

Federal Railways 1937 Budget

The 1937 budget of the Swiss Federal Railways, which was recently approved by the Administrative Board and will be submitted to the Federal Assembly during the next session, shows the following provisions:—

	Fr.
Construction account	16,524,500
Traffic working—	
Receipts	289,907,000
Expenses	227,609,000
Profit and loss account—	
Receipts	90,382,000
Expenses	169,552,000

The budget had been prepared before the devaluation of the Swiss franc, but no important changes have been made to it since, as it is not expected that the railways will be appreciably affected by this measure.

Expenditure upon construction has, in pursuance of the policy followed since 1935, been kept so low as to be entirely covered by industrial and financial depreciations and the sale of scrap material. The most notable works to be undertaken or continued during 1937 are:—

The electrification of the Sonceboz-Moutier line (announced in the May 29 issue of the *Electric Railway Traction Supplement*); extensions of Geneva, Neuchâtel and Basle stations; a four-track deviation between Bern station and the junction of the Thun and Olten lines at Wilerfeld; the doubling of the Sentimatt junction (Lucerne) to Emmenbrücke line; and new colour-light signalling at Sargans station. The equipment of all electrified lines with automatic train control, now well advanced, is to be completed during the year.

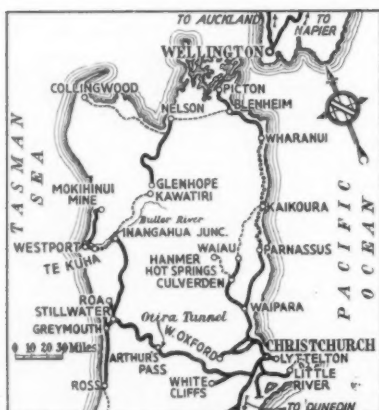
Orders for Rolling Stock

Rolling stock orders are to include the following:—

Light railcars and trains, two 0-6-0 electric shunting locomotives, 10 light tractors (both petrol and electric) for service at small stations, 22 coaches, 10 luggage vans, 60 goods wagons, and also four steam locomotives for the narrow-gauge Brünig line if it is decided not to electrify this section.

With regard to the light high-speed trains and railcars, particulars are to be announced later, but it is understood that they are to include electric and diesel vehicles, both as single units and in trains of 2 and 3 cars; the total credit required for this order amounts to fr. 2.4 million, of which 1 million appears in the 1937 budget. At the end of 1937, the Federal Railways rolling-stock will comprise 496 electric and 412 steam locomotives, 58 railcars, motor-coaches and multiple-unit sets, 140 light tractors, 3,512 coaches, 640 luggage vans and 15,720 goods wagons.

The estimate of receipts is based, on the one hand, on the probability of a



Sketch map of lines under construction in South Island, New Zealand

slight increase of certain kinds of traffic owing to the devaluation of the Swiss currency, but on the other hand on the continuous decline in receipts during the last few years owing to road competition and the general depression. As compared with the figures for 1929, those for the first nine months of the present year show a decrease of 30.7 per cent., and even compared with 1935 there was a fall of 6.6 per cent. for passenger receipts and 13.4 per cent. for freight. Working expenditure, however, has been reduced to a remarkable extent, the total amounts for 1930, at the beginning of the depression, and 1937 (estimated), being fr. 291 and 227 million respectively, a decrease of 22 per cent.; this is mainly due to staff and salary reductions and rationalisation.

BRAZIL

Signalling Conference at Rio

In order to implement the recommendations of the Porto Alegre Transport Congress, the Federal Inspectorate of Railways, with the sanction of the Minister of Transport, is organising a conference of signalling and block working experts, to take place in Rio between December 2 and 9. The principal items on the agenda are as follows:—

- (1) Types and methods of block-working and signalling used.
- (2) Regulations concerning protection of trains.
- (3) Standardisation and uniformity of rules and bell-codes.
- (4) National manufacture of safety devices and train-control apparatus for Brazilian railways.
- (5) Sundry matters, such as: (a) selection of qualified men to supervise block and signalling installations and the observance of regulations; (b) medical examination of staff, with special reference to eyesight and the testing of mental capacity; (c) compilation and wording of rule-books, statistical data, &c.

The organisation of the conference is in the hands of the special Commission for Standardisation and Co-ordination of Transport, and the Federal Railway Inspector, Dr. Alvaro Crespo de Oliveira, will be in the chair. During the conference visits will be paid to signalling installations on the Leopoldina and Central Railways, and in an annexe there will be on view models of block apparatus and signals contributed by railways and national engineering firms.

SPAIN

Railway Position Straightened Out

A Bill of the Madrid Government, dated September 28, provides for all the "popular militia" to come under military rule as from October 20, but allows any individual of the voluntary militia not desiring to continue under military rule and discipline to withdraw and hand over his arms, on notifying his commanding officer. This timely measure will, it is hoped, put an end to the anarchy that has existed since

the Madrid Government armed the "proletariat," or rather, legalised the carrying of arms by all and sundry. In the confusion which inevitably attended this measure it has been virtually impossible to control the passenger traffic on railways and tramways, as trains and trams alike were constantly occupied by individuals carrying arms, who not only declined to pay or produce a ticket, or to vacate the best seats, but were positively aggressive to the unfortunate ticket collectors. The Workers' Committee which is now responsible for running the Madrid tramways issued an appeal some days ago pointing out that it was impossible to work the tramways on the basis of free travel, the abuse of which was estimated at some 35,000 fares daily. Militarisation, it is hoped, will stop this and also the constant parading of stations and trains by blue-clad individuals carrying rifles and pistols but without any other authority. The militarisation of the militia will also regularise the position of the railway employees themselves. Up to the present it has been impossible to distinguish, especially in the sections near the front lines, between the active forces and the railway staff. In normal times the Spanish railwayman, with the exception of the ticket collector, wore no regular uniform, except sometimes a braided cap, and the universal adoption of the blue dungaree overall has made it even more difficult to distinguish between combatants and non-combatants.

CHINA

Nanking-Shanghai Railway

Considerable acceleration of passenger services between Nanking and Shanghai is to take place in November, when the new super-expresses are installed between the two cities. Test runs have proved the possibility of reducing the timing to 4 hr. 50 min. as against the present 6-hr. schedule.

Weishui-Tsinghsing Line

Work has been commenced by the management of the Chengtai railway on a branch line, some 12 km. long to the Tsinghsing coal mine, connecting with the main line at Weishui station. The work is being pushed forward, and it is hoped to complete the construction within three months, although there are 26 bridges and culverts to be constructed and two stations to be built. The line when completed will be capable of dealing with 5,000 tons of coal daily. The cost of construction is estimated at \$500,000.

Railway Local Development Committee

Railway exhibitions are held from time to time to enable the public to obtain fuller information of the products of the localities served by the various lines with a view to stimulating trade. Now too, the Ministry of Railways has appointed a committee to

study the economic conditions within a radius of about 50 km. of the Nanking-Shanghai and Shanghai-Hangchow-Ningpo railways, with the following duties:—

To study the outstanding industries and the possibilities of their development with a view to stimulating economic development and increasing the volume of the products of the area. To study the relation of railway charges to commodities and generally to improve traffic facilities where possible.

Canton-Hankow Railway

Though through running is now established over the whole of this line, there has so far been no formal opening ceremony. It had been intended to hold this on National Independence Day, October 10, but it has now been decided to postpone the function until next spring, by which time the first and second class coaches and dining cars on order from England will probably have been delivered and the new headquarters office buildings at Wuchang (Hankow) will be completed. All the third class coaching stock has now been delivered.

Shanghai-Hangchow-Ningpo Railway

The survey of the unfinished part of this line has been completed, and construction work will be begun after the rice harvest later in the year, as a considerable part of the land is under cultivation. It is hoped to complete the line and open it to through traffic in eight or nine months, which will bring the opening date to about July, 1937. The bridge over the Tsao Ngo River has remained in an unfinished state since the beginning of the war, when the work had to be abandoned, and the completion of the bridge as a four-span structure, with some 80 smaller bridges over numerous waterways, will be included in the work.

New Rail and River Express Service

A new service of express steamers to ply between Nanking and Hankow is being arranged by the Ministry of Communications. Two new steamers are to be constructed for the China Merchants' Steam Navigation Company, each with a displacement of 3,000 tons, with ample cargo accommodation and provision for 800 passengers of all classes. The vessels will cost about \$1,000,000 each. The purpose of this new Yangtze River service is to facilitate connections between the Peiping-Hankow, Canton-Hankow, Tientsin-Pukow and Nanking-Shanghai Railways via Nanking and Hankow. Two round trip services will be maintained weekly. The journey from Shanghai can then be shortened for passengers who go by rail from Shanghai to Nanking and thence by express steamer, instead of going through from Shanghai to Hankow by river throughout as at present. Owing to the swift current the journey from Nanking to Hankow will occupy 34 hours, whereas in the reverse direction the journey downstream will be covered in 25 hours.

FLYING AND BURROWING JUNCTIONS ON THE SOUTHERN RAILWAY—II

By S. BARTER (Assistant for New Works and Rules and Regulations, Southern Railway)

(Continued from page 751)

IN 1889 the L.S.W.R. opened the line between Wimbledon, East Putney, and Putney Bridge, and in connection therewith a flyover for up trains was projected across the lines running between Clapham Junction and Richmond lines rejoining the up Windsor line by trailing points at Point Pleasant junction (Wandsworth) as seen in Fig. 15; the down line to East Putney was also provided at this junction off the down local line. This branch line not only provided a needed relief to the main line route to Wimbledon for the company's suburban services, but was and is a much frequented route for the running of empty

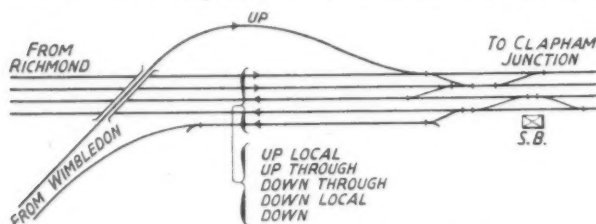


Fig. 15—Point Pleasant Junction, L.S.W.R.

trains between Waterloo and the berthing sidings and depot at Wimbledon Park.

Fig. 16 shows probably the most important main line flying junction laid out by the former L.S.W.R., namely, that at Battledown, near Worting junction (situated 2½ miles west of Basingstoke), and brought into use in the year 1897. At this point the junction to Southampton and Exeter was formerly laid out on the level, the points

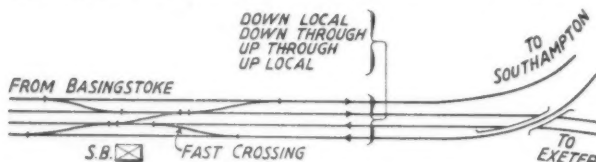


Fig. 16—Worting Junction and Battledown flyover, L.S.W.R. (1897)

being controlled from Battledown box. With the opening of four lines of way beyond Basingstoke, and the development of traffic to Southampton, Bournemouth and the West of England, the necessity for a more modern junction layout became a pressing one, and this led to the construction of the Battledown flyover for up main-line trains from the direction of Southampton and Bournemouth passing over the down and up Exeter lines, and forming the up local line to Basingstoke. By this means up express trains from the south were able to run free of junction restrictions, and, by the provision at a later date of a long crossover designed for fast running (the first of its kind on the system) from the up local to the up through (fast) line at Worting junction, to continue in speed (60 m.p.h.).

The second important main-line flyover opened by the L.S.W.R. was in 1901 at Pirbright junction, situated 1½ miles west of Brookwood (see Fig. 17) serving the line from Farnham and Aldershot. In this case also the junction with the Aldershot branch formerly came in on

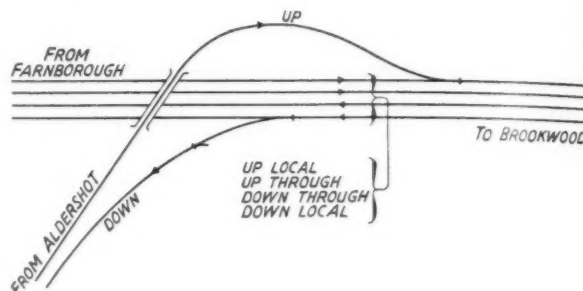


Fig. 17—Pirbright Junction, L.S.W.R. (1901)

the level at Pirbright junction, but in anticipation of the widening to four main lines between Brookwood and Farnborough, the opportunity was taken to construct the flyover for the up Aldershot line which converges on the up local line at Pirbright.

In 1903 was introduced an important burrowing junction for down branch trains between Addlestone junction

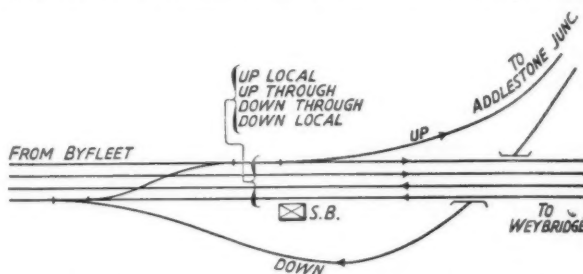


Fig. 18—Burrowing junction at Byfleet, L.S.W.R. (1903)

(on the Chertsey branch of the L.S.W.R.) and Byfleet junction, situated west of Weybridge, as a first step in a widening scheme from two to four main lines between Weybridge and Byfleet, which followed later in the same year. By this means down trains from Chertsey which formerly ran on the level from Addlestone junction to Byfleet junction passed under the main lines and rejoined

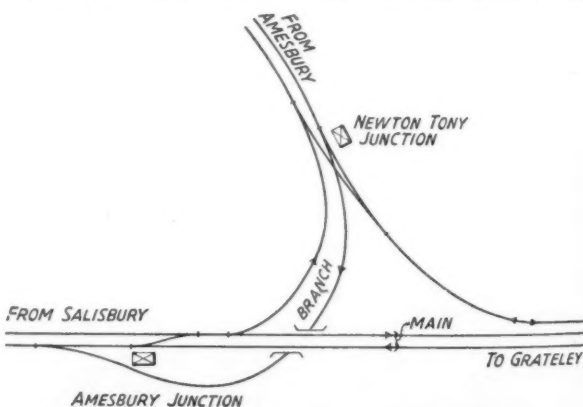


Fig. 19—Amesbury Junction, L.S.W.R. (1904)

the down local line at Byfleet junction (see Fig. 18). This route is used extensively by heavy freight trains from the Feltham marshalling yard, and notwithstanding the gradients of 1 in 148 falling from Addlestone junction and 1 in 114 rising towards Byfleet junction before entering upon the main line, breakaways are extremely uncommon.

Fig. 19 shows another interesting burrowing line, avoiding the crossing of main lines, between Newton Tony junction and Amesbury junction, 8 miles east of Salisbury, which was opened in the year 1904, two years after the opening of the Amesbury branch which serves the important military centre of Salisbury Plain. The Amesbury branch was formerly served only by a single line from the direction of Grateley, but in connection with the conversion of a portion of the branch into a double line the scheme provided for the opening up of a route to Salisbury, and a double line junction was formed with the main lines at Amesbury junction, the up branch line passing under the main lines and joining the down main line at that junction.

For the next important development of the burrowing junction principle, we go back to the Eastern Section

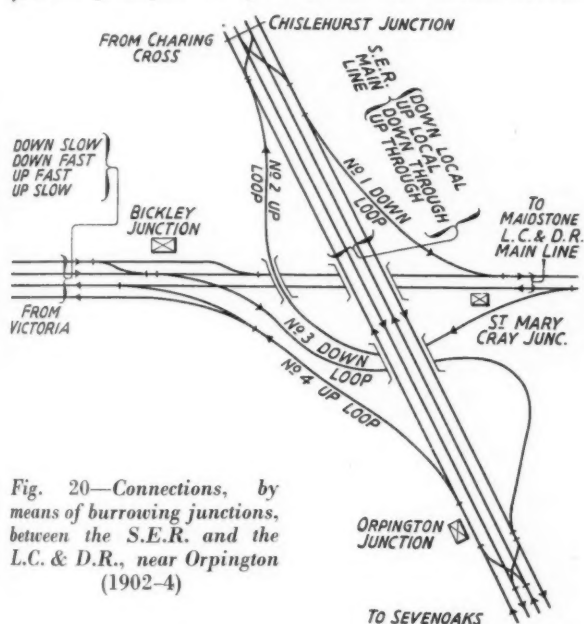


Fig. 20—Connections, by means of burrowing junctions, between the S.E.R. and the L.C. & D.R., near Orpington (1902-4)

(S.E. & C. R.) where in 1904 was introduced a diving junction between St. Mary Cray junction and Chislehurst junction for up Maidstone line trains, and in 1902 between Bickley junction and Orpington junction, for down trains from Victoria (Fig. 20). The provision of these burrowing lines marked an important step in the development arising out of the amalgamation of the South Eastern, and London, Chatham & Dover lines, and was carried out in conjunction with the widening of the South Eastern main line between St. Johns (about 3½ miles east of London Bridge) and Orpington. The object of the junctions was to provide physical connections near London between the S.E. main line via Orpington and the L.C. & D. main line, to enable trains to run between the London termini and the main lines of both companies.

It will be seen from Fig. 20 that the burrowing line from St. Mary Cray junction, shown as No. 2 up loop, passes under the four S.E. main lines and over the L.C. & D. main lines, rejoining the S.E. main line at Chislehurst junction (No. 1 down loop is laid in on the

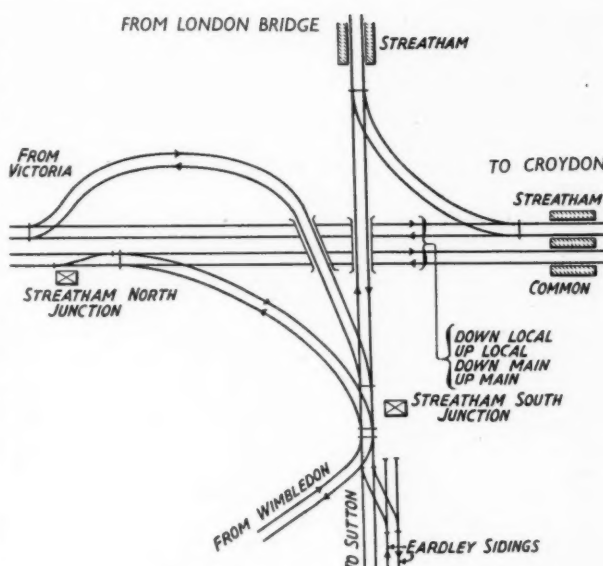


Fig. 21—L.B.S.C.R. flyover of 1908 at Streatham

level from Chislehurst junction to St. Mary Cray junction). The Bickley junction-Orpington junction burrowing junction begins with a flat junction at Bickley junction (crossing the up L.C. & D. main line on the level) and passes under the four S.E. main lines, rejoining the down local line at Orpington junction (No. 4 up loop is a direct line on the flat between Orpington junction and Bickley junction).

The flyover junction introduced by the L.B. & S.C.R. in 1908 (see Fig. 21) between Streatham North Junction and Streatham South Junction boxes was provided as part of a comprehensive scheme of widening between Balham junction and East Croydon, under which two additional lines, known as the down and up local lines, were opened to give relief to the two main lines then existing. The new flyover carrying two lines, viz., the down and up local spurs, formed a connection with the new down and up local lines, and passing over the four local and main lines rejoined the Sutton line at Streatham South Junction

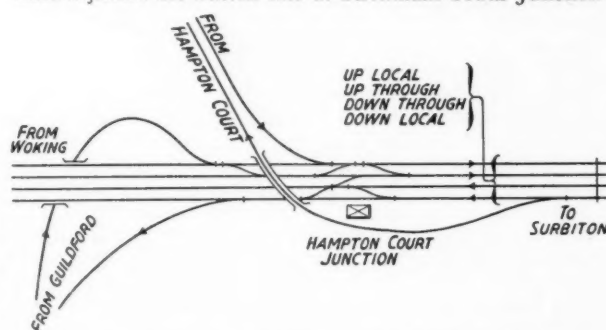


Fig. 22—Burrowing junction at Hampton Court (1908)

box. The new spur lines not only provided independent running for suburban services between Victoria and Sutton, but gave access from the local lines to the extensive berthing depot at Eardley sidings (situated close to Streatham South junction).

Fig. 22 shows yet another burrowing junction opened by the former L. & S.W.R., in 1908, at Hampton Court junction, for up branch trains from the direction of Cobham and Guildford. The branch line formerly joined

the main line at this junction on the level, but in view of the development of the branch and the increasing use of the important junction at Hampton Court junction (which incidentally deals with the traffic passing on four main lines and two branches), the diversion of the up branch line as a burrowing line became a necessity.

The latest flying junction brought into use on a constituent of the Southern Railway was on the L.S.W. Section in 1915 at Hampton Court Junction (also shown in Fig. 22) and its importance lies in the fact that it was the first flying junction opened in connection with that company's electrification scheme. Electric trains to Hampton Court from Waterloo were actually introduced on June 18, 1916, and in anticipation of this service and to eliminate the incidence of crossing movements at this important main line junction, the old flat junction to the Hampton Court branch was abandoned, and in its place a flyover line for down branch trains was thrown across the four main lines to a point on the branch itself, where it picked up the existing down branch line leading to the Hampton Court terminus. The line forming the approach to the bridge was taken back to a point near Surbiton station, a distance of $1\frac{1}{2}$ miles, thus affording a quick clearance of the down local line at Surbiton for down branch trains.

Finally, the flyover line just completed east of Wimbledon (Fig. 23) and referred to at the beginning of this article forms an integral part of a comprehensive scheme of acceleration and augmentation of train services to meet the increasing needs of the ever growing population in the suburban and outer suburban areas. Notwithstanding the existing facilities for suburban traffic into and out of Waterloo, the Southern Railway found it had reached a point when it was not practicable to entertain any appreciable increase of train service into that terminus, one

of the reasons being the constant crossing and fouling movements between up and down trains which took place on the level outside the terminus. The decision to provide a new railway in the neighbourhood of Motspur Park (on the Epsom line), and the increasing demand for faster services from the suburbs into London, brought about a position that called for a scheme of some magni-

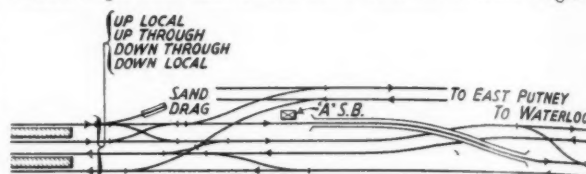


Fig. 23—The new flyover at Wimbledon in connection with the improved approach to Waterloo, Southern Railway

tude of remodelling of layout and signalling, regard also having to be paid to future requirements. One of the essentials of such a comprehensive scheme was that up electric trains, which are mainly confined to the local line, should be brought across to a position adjacent to the down main local so that they could parallel each other into the terminal roads principally set aside for electric working at Waterloo. To effect this diversion of the up main local line, it became manifest that a flyover line would be essential, and the nearest and most practicable site for this was found near Wimbledon. The bridge carrying the flyover passes over the down and up through (or fast) lines, and is approached by a rising gradient of 1 in 60, while at the other end of the bridge the descending line has a gradient of 1 in 40; a speed of 40 miles an hour is permissible over the flyover.

Hawkesbury River Bridge

A CORRESPONDENT has raised a question of general interest when he states that the foundations of the Hawkesbury River bridge, in New South Wales, are claimed to be the deepest group of bridge foundations in the world. The bottom of one is 202 ft. below water level and, with one exception, all are over 100 ft. Without searching many records, it may be said at once that in the case of several more modern bridges numbers of foundations are as low as 150 ft. below water level, so that on an *average*, or as a "group," they may quite easily exceed in depth those of the Hawkesbury River bridge. Be this as it may, this bridge is not so well known in this country that a brief description of its construction may not be of some interest here.

About 30 miles north of Sydney, the very wide and deep Hawkesbury River was a formidable barrier to the linking by rail of Sydney and Newcastle, the second city of New South Wales, at the time this task was begun about 50 years ago. When the railway from Sydney reached the river, the line was carried along steep slopes until it came opposite Long Island, which lies off the south bank and this island, and a tunnel driven through the high ground of the island to the bank of the main channel, which is 3,000 ft. wide at this point. In the meantime plans had been completed for the construction of a bridge which, until the completion of the Sydney Harbour bridge, was the largest in Australia. Workshops and stores were erected on Dangar Island, down stream, and accommodation provided for the workmen.

The bridge, which took three years to build and was opened in 1889, carries a double-track railway, and consists of seven through-truss spans, each 416 ft. long—

making a total length of 2,912 ft.—carried on six piers founded in the river bed. Caissons were sunk until solid foundations were reached, and the steel tubes were then filled with concrete to form bases for the masonry piers. Attention has already been called to the remarkable depth of some of these foundations. The spans were erected on high falsework on barges at Dangar Island, and each in turn was floated out between the piers when these were ready, and gradually lowered into position on the ebb tide, the supporting barges being partly sunk to complete the movement.

FELIXSTOWE BRANCH TO BE DOUBLED.—Plans have been completed by the L.N.E.R. for the improvement and modernisation of the single-line branch from Ipswich to Felixstowe, on which traffic has doubled during the last two years. During the summer as many as 87 trains daily pass over the branch. Difficulties have also been experienced on account of the short platforms at intermediate stations and the lack of carriage sidings at Felixstowe. The branch leaves the main line at Westerfield, the first station beyond Ipswich, and the stations on the branch are Derby Road, Orwell, Trimley, Felixstowe Town and Felixstowe Beach. It is proposed to double the line between Derby Road and Felixstowe Town, a distance of $9\frac{1}{2}$ miles; at Westerfield the down platform is to be extended and a loop line provided; at Derby Road additional platform and siding accommodation is to be laid and improved goods facilities installed; at Orwell permanent-way alterations will be made and the platforms at Trimley are to be extended. At Felixstowe Town an additional island platform is to be built with a run round loop to enable engines to be released quickly; an additional carriage siding is to be provided; a new 60 ft. turntable is to replace the existing 50½ ft. table.

THE IRISH INTERNATIONAL MAIN LINE—II

A brief description of the regirdering of the Boyne viaduct, which structure as so strengthened formed the final link in the modernisation of the Dublin-Belfast main line

THE first work in the viaduct regirdering was the conversion of the double line to a temporary single track along the centre line of the structure, together with the provision of the necessary connections from the double to the single lines at each end, and the temporary signalling arrangements. While the reconstruction work was in progress all traffic had to be worked over the single line, and trains were brought to a stand at either end, where the pilotman, whose duty it was to accompany each train, was taken aboard; the movement of traffic being regulated by a flagman on the work, acting on instructions from the Resident Engineer. By shifting the track to the centre of the structure, sufficient space on each side was left for the erection of the new girders between the inside faces of the old ones, and the loading gauge for the line. With the track in the centre, the old cross girders were highly stressed, principally due to the curvature of the upper flange, and, in consequence, a speed restriction of 5 m.p.h. had to be imposed on all traffic.

In the restricted space available, and having regard to the presence of the top chord wind bracing, it was impossible to handle the new material from a crane working on the track, and it was, therefore, decided to erect a 10-ton overhead travelling gantry, running on rails laid on timbers carried on the top chord of the old main girders, the height to the underside being about 40 ft. above rail level in order to clear the highest points in the new centre span. At the south side of the viaduct a site was made over to the contractors as a dépôt for storing and assembling the old and new materials, which were handled by a 5-ton derrick crane, any pieces of greater weight being dealt with by the company's breakdown crane. New and old materials were bogied from the dépôt to the site of the work and vice versa, along the running line, between traffic, and under the usual protection afforded for such operations on a railway.

Cantilever Method of Erection Adopted

The conditions of the contract provided for the new girders being erected by cantilevering simultaneously from the piers and abutments, until the various spans met and were joined at their centres. It was not intended to allow any weight, in excess of ten tons a girder, to be placed on the old structure. There was, however, considerable delay in completing the fabrication of the girders in the bridgeworks, and it was therefore deemed advisable to allow the end spans to be erected by supporting them until fully bolted from the old bridge, one girder only in each end span being dealt with at a time, and the additional load on each old cross girder limited to three tons placed as close as possible to the bearing on the old main girders.

Each end span main girder, excluding the end posts, weighed about 50 tons, of which about 40 tons were transmitted to the old main girder nearest to it, while the reduction in live load carried by the latter, in consequence of the altered position of the track, was estimated at about 42 tons. The extra load on the old girders was, therefore, limited to the weight of the gantry and tackle carried by it, amounting to about 10 tons, a figure which did not exceed the margin allowed. Lifting of material by means of the winches on the gantry had to be done when the bridge was free of traffic, and each piece was placed in position before trains were allowed to cross.

To permit of the work of erection being commenced it was necessary to remove the heavy cross and wind girders of the old structure over the abutments and piers, as well as the portal bracings at these points. The Z bars and way beams carrying the track were cut and supported on timber from the masonry, while temporary portal bracing was provided before the old bracing was removed. The old cross girders and portal bracing on the piers and abutments had a width of 3 ft. and 1½ ft. respectively, but the temporary portal bracing had to be limited to an overall width of 1 ft. so as to fit between the end posts of the new girders when erected. The relationship of the old and new structures is shown in photographs on pages 791-2.

End Spans Main Girder Erection

When the distributing joists on the piers and abutments had been placed in position, as well as the grillage joists, distributing girders and the lower bearing castings, the work of erection was commenced, and carried forward as expeditiously as possible, one girder at a time. Each girder was temporarily stayed from and tied to the old structure, and, when joined in the centre, the folding wedges over each old cross girder were removed and the girder made self-supporting. The number of barrel drifts and fitted bolts in each joint and connection was just sufficient for carrying the weight of the main girder, and half the total weight of the cross girders, floor plates, parapets, ballast plates and wind bracing in the span. The second main girder in the same span was next dealt with in the same way, and, when in the same condition as the first, the cross girders and top chord wind bracing were placed in position and bolted up. Following this the rail bearers, parapets, ballast plates and the floor plates were temporarily laid down on the span in order to add their weight, and bring the girders under conditions similar to those in which they had been erected in the shops.

At this stage the riveting was begun at the end posts and carried forward simultaneously along the upper and lower chords to the centre of the span. The presence of the Z bars and the way beams carrying the track rendered it impossible, at the outset, to place the cross girders in their final positions, but they were put in their proper line pulled up as close as possible to the Z bars, and partly bolted, in order to stiffen the new structure transversely. The floor of the old bridge was removed, from each end span, in two operations, in one week-end, whereupon the new cross girders were put into final position and bolted up to the main girders with fitted bolts in every hole. At the same time the rail bearers were also put into position and bolted to the cross girders, while the floor plates, where under the running line, were laid down and partly bolted and the track temporarily restored on specially prepared way beams laid on the new rail bearers and adequately stayed. The completion of the ballast plates, parapets and the remainder of the floor plates as well as all the riveting, was carried out during the week, between traffic.

Centre Span Cantilevered from New End Spans

Meanwhile the fabrication of the steelwork for the centre span, the completion of which was considerably overdue, had been inspected, the girders tested and marked for re-erection, and thereafter dismantled and shipped to the

site, the first consignment arriving about the middle of August, 1931, shortly after the work on the end spans had been completed. Owing to the weight, approximately 450 tons, this span could not be erected by supporting it from the old structure, and as the end spans were now carrying the traffic, the scheme adopted had to provide for the centre span being made self-supporting during erection, and for the erection stresses carried to the new end spans being such as to keep the total stress in any member of the latter within safe limits. It was decided to carry out the work by cantilevering from the new end spans in two stages, working simultaneously at all four corners of the centre span, as illustrated on page 792. The first stage included the first two panels and the lower chord and diagonal of the third panel of the centre span, while the second stage carried the work to the centre of the span.

For the first stage, temporary erection pins, $4\frac{1}{2}$ in. diameter, in specially templated tie plates, were provided connecting the tops of the end posts of adjacent spans, and the thrust at the foot of the end posts was taken up by a bar, 8 in. in diameter, housed in temporary brackets bolted to the lower chord on the main girders, and controlled by a hydraulic jack of 200 tons capacity. For the second stage, the load passing through the pin connecting the tops of the end posts was transferred to temporary towers and ties, combined with back balance on the end spans. Care had to be taken to see that erection commenced on the piers in such a position, and at such levels, as would ensure that the centre post of the large girders would be vertical at the time when both halves met, and that there would be sufficient, but not too much, clearance left between these halves which could be closed by operating the toggle screws so as to lower the outer ends of half spans. The position selected was fixed on the assumption that the gap at the centre of the top chord would be 2 in. when about to meet, and that the corresponding faces of the joints in the lower chord would, at that stage, be in contact.

Details of Erection Stage by Stage

The first stage of the work was carried through without difficulty, and when completed the calculated load passing through the pins and thrust rods and taken up by the end spans, was 88 tons. The remainder of the bottom chord was now laid out on the old structure, and carried on camber blocks of predetermined thickness supported on each of the old cross girders. The small gap left at the meeting faces was closed by operating the jacks at the foot of the end posts, but the joints were left unbolted until the work of erecting the various members in the second stage had reached that point. At this point the temporary towers, ties and toggles, shown in the first two illustrations on page 792, had been erected and adjusted, the dip of the ties over the centre span at the toggle being fixed at 2 ft. 9 in., and the pins connecting the ties to the top of the towers put in. The jacks were again pumped up sufficiently to ease the pressure on the $4\frac{1}{2}$ -in. diam. pin which was removed when the load was transferred to the masts and ties. Just prior to joining the two halves, the load passing through each thrust bar and jack was about 160 tons, 40 tons through the toggle and 173 tons through the ties over the end spans. The end spans being under almost full load, except impact, it was necessary, in order to deal with a thrust of 160 tons, to stiffen the lower chords of the 4 panels next the centre span, and this was done by means of temporary brackets fixed to the ends of the old cross girders which had been left in for the purpose when the floor was removed. Partly as back balance, and partly

to reduce stresses, a dead load of 24 tons of old rails was concentrated on the first, second and third of the new cross girders of the end spans, while the balance of counterweighting was provided by means of 26 tons of old rails placed at the extreme ends of the spans. While the centre span was being erected, the calculated stresses in the new end spans when carrying traffic did not exceed the allowable stresses in any member by more than about 25 per cent.

Joining the Two Halves of Each Span

The work of erection during the second stage proceeded uniformly, and the cross girders and top chord wind bracing, except one diagonal in each bay, were placed in position as the work reached that stage. When the free ends had reached the centre, the gap in the top chord was found to vary from $2\frac{1}{2}$ in. at the top to $2\frac{1}{4}$ in. at the bottom, while the corresponding joints in the bottom chord were in contact. At this stage, the toggle screws were operated by ropes and tackle, as shown in the second illustration on page 792, four men at each point, working as much as possible in unison, and the movement of each half-span checked from time to time, to ensure accuracy. The toggle screw nuts were run back about 24 in. in order to bring the faces at the centre into contact, whereupon the cover plates were put on and the joints bolted there, and in the lower chord on each side of the centre. The nuts were then run out to the end of the thread of the screws and the hydraulic jacks and thrust rods removed, leaving the span self supporting between the bearings. When the camber was checked it was found to be regular, and to agree well with the calculated amounts. The work of loading the span with rail bearers, ballast plates, parapets and floor plates, preparatory to riveting, and then the riveting, completion of the floor, &c., were carried out in the same manner as for the end spans, the old floor being removed and a new floor substituted in two successive week-ends. The live load was finally transferred completely from the old to the new structure on June 5, 1932. When the girders had been completed the timbers between the underside of the main girders and each of the bearing castings were removed, and the upper castings and expansion rollers placed in position.

In all girders, the work of erecting the counter-bracing was deferred until the full dead load had been applied to each span. For this purpose the counter-bracing was sent from the workshops drilled at both ends, but the holes through the gusset plates to which they were to be connected were drilled in the shops for one end only, the other end being dealt with when the girders had assumed their true form under the full dead load.

Removal of Old Steelwork

The contract included taking down and disposing of the material in the old structure, and this work was now taken in hand. It had been intended to remove the girders in sections of considerable size, lowering these direct into barges moored in the river. For several reasons this scheme had to be abandoned for the more laborious one of cutting the material into pieces having a maximum weight of about 2 tons, lowering these on to bogies running on the track, and cutting them up for shipment in the contractor's depôt at the south side of the viaduct. As the new structure was now carrying the heavier traffic for which it was designed, and that without speed restriction, it was obviously impossible to use it for supporting the old girders while being dismantled. The work had therefore to be done by cutting the continuous girders at the centre of the centre span, and converting the halves into two cantilevers. The cutting had to be done so



The old Boyne viaduct, which was completed in 1855 and remained in service until June, 1932



Dismantling the old Boyne viaduct spans in 1932 after the new had been built inside the old



The new Boyne viaduct as finally completed and old spans removed in November, 1932



Centre span of new superstructure being erected from each end as a cantilever structure

that the upward thrust on the new bridge never exceeded 10 tons, and the downward thrust 4 tons. The method and arrangements adopted are shown in the middle illustration on page 791 and the right-hand one below.

When the dismantling tackle had been placed in position the girders were cut at the centre, and in order to avoid any risk it was desirable to eliminate, as far as possible, the stresses at that point. As the girders were symmetrical about their centre, practically no stress was passing through the diagonal bracing there, but, in the upper and lower chords the calculated stress was about 120 tons, which had to be passed clear of the section before it was burned through. Brackets and supports for the jacks were put in, and during a week-end the diagonal bracings at the centre of the girders in the centre span were burned through, 3 ft. on each side of the centre for the full depth, so as to remove 6 ft. of bracing. The hydraulic

jacks in the lower chord, which were fitted with pressure gauges, were pumped up to register about 130 tons, and packed tight with hardwood, after which the chord was cut. On releasing the jacks, the girders were found to have deflected about $\frac{5}{8}$ in. The jacks were then transferred to the top chord, pumped up so as to release the steel packings which were taking the load, and the flange cut away for a width of 3 in. When the jacks were released the deflection had increased to $1\frac{1}{2}$ in. at the ends of the south half, which, after an hour or two, increased to $2\frac{1}{2}$ in., while for the other half the deflection increased from $1\frac{3}{8}$ to $1\frac{1}{4}$ in. within a few hours.

The girders were now cut into halves, and the uplift at the abutment ends was about 6 tons, or at the holding-down beams, about 8 tons. To provide against wind pressure the old and new structures were packed with timbers at each vertical of the latter along the upper and



Left: Toggle screws worked by rope and tackle for lowering half centre span into final position for joining up with other half. Right: New superstructure as completed, showing dismantling of old girders in progress outside new ones, and interlaced track with 6 in. \times $3\frac{1}{2}$ in. \times $\frac{1}{2}$ in. guard rails

lower chords of the former. As a precaution against accidents when cutting at the centre, safety tackle was provided, but it did not come into operation, as it was only intended, and was set to act, if the deflection exceeded 3 in. Equal portions by weight were removed alternately from the centre and end spans, working towards the piers, the bias being towards the centre span, and the holding-down beams were moved alternately, as required. The lifting tackle was fixed to the new bridge, and was designed to deal with loads up to 2 tons maximum. The removal of each half of the old structure occupied about six weeks, and all cutting was done by oxy-acetylene burners. The old structure had been completely removed by November 16, 1932.

The New Flooring

The floor of the bridge is concreted over the buckled plates to a suitably cambered surface, on which the best quality bituminous sheeting, with sealed joints, laid transversely, was put down and in turn covered over with a layer of concrete, 1½-in. thick for protection. Surface water is removed through down pipes, one in opposite corners of each panel and protected by rose heads. The viaduct, between the points of convergence of the double and interlaced tracks, is protected by guard rails on each side, consisting of an angle 6 in. × 3½ in. × ½ in. carried on brackets bolted to the sleepers of the track, as in our last illustration. This type of guard rail was adopted, in preference to one fixed to the structural work, in order to overcome the usual difficulty experienced in maintaining a constant clearance between, and uniform height above, the track rails.

The whole of the steelwork was given a coat of red lead paint before leaving the contractors' workshops, and

after the old structure had been removed, all exposed surfaces were, thoroughly cleaned, scraped where necessary, and again red-lead, and the main girders and wind bracing given three coats of oxide of iron paint, while the floor received three coats of Ferrodor paint, all finished in a light shade of grey.

The double line on each side of the viaduct converges to an interlaced track over the structure, no switches being provided, in order that smooth running over the connections might be obtained. The interlaced portion of the line is protected by distant signals, placed about 1½ miles out, and by outer and inner home signals, all of which are electrically operated and controlled by track circuiting, which extends for the full length of the interlaced portion, and beyond that for about ½ a mile on each line, in both directions. On the north side the line falls at about 1 in 170 towards the viaduct for about 4½ miles, and the distant and outer home signals in that direction are equipped with Klaxon loud-sounding electric horns, operated from short track circuits in advance, and giving drivers audible warning of their having passed the signals.

The total cost of the work, including removing the old structure, masonry, concrete and asphalt work, permanent way, signalling, and all incidental charges, amounted to about £37,000. The principal contract was entrusted to the Motherwell Bridge & Engineering Co. Ltd., Motherwell, Scotland; the masonry work was carried out by Thomas McDonald & Sons Limited, Dundalk, Irish Free State; and the signalling work, partly by the company and partly by the Railway Signal Co. Ltd., London. All other work was carried out by the company with its own staff. The work was finally completed at the end of 1932.

New Gas Lighting Equipment at King's Cross Goods Depot, L.N.E.R.



The new gas lighting equipment at King's Cross goods depot, described on page 768 of "The Railway Gazette" for last week, has enabled an acceleration in the handling of freight in the low-level outwards shed. The illustrations above show the arrangement of the lamps and the even distribution of light

POWER SIGNALLING AT WATERLOO

Extensive Southern Railway re-signalling scheme completed

EARLY on Sunday, October 18, the Southern Railway completed the extensive power signalling installation between London and Hampton Court Junction, the greater part of which was described in our issue of May 29, by opening the new all-electric power signal box at Waterloo terminus; the new installation replaces the familiar "A" box, which has controlled the traffic for 44 years, and certain others as far as Loco Junction beyond Vauxhall. The new layout is shown on the accompanying

spare. The working is broadly separated into up and down main local lines at the Vauxhall end, the remaining main lines in the centre, and the Windsor lines at the station end. The interlocking is entirely electrical and indications above each lever repeat the condition of the function concerned. The end frames have one illuminated diagram, the centre one two; each track circuit section is repeated by two red lights, which glow when it is occupied. "Train ready to start" lamps are provided



The new power frame at Clapham Junction "A" box

diagram, which replaces that illustrating the temporary arrangements reproduced in the article referred to. As the principal technical details were dealt with therein, there will be no need to repeat them here. A uniform system of colour-light signal aspects now prevails throughout the area concerned. The work forms part of the general scheme for improving the approach to Waterloo and enabling trains to be dealt with more expeditiously, especially at the entrance to the terminus. To avoid unnecessary crossing movements, the up main local line has been brought next to the down main local by means of the flyover at Wimbledon, described in our issue of May 22.

The New Waterloo Box

This is a concrete structure on the north side of the line, a little west of the girders carrying the old box; it contains three all-electric frames arranged on the west, north, and east sides of the box to form three sides of an oblong, containing 75, 159 and 75 levers, the signalmen working inside them. Of the total of 309 levers, 27 are

for each platform line. These light up when the platform inspector presses a button, and are extinguished by the pulling of the relative starting signal lever. Telephones are provided from the box to 27 locations in the area, to enable drivers to communicate when detained by signal, and there is loud-speaker equipment to the down sidings. Train describers are used to convey and receive information concerning class and destination of train movements; the next box is now Loco Junction, Nine Elms. The layout is, of course, completely track circuited, but at the buffer stops in each platform line this is supplemented by electric fouling bars. There are 153 track circuits.

Signals, Route Indicators and Points

The running signals give the colour-light aspects in use for some time on the line, and route indicators, of the multi-lamp type, displaying letters or numbers, are used in conjunction with home and starting signals, there being 34 in all. For running and crossover junctions the new position-light junction indicator is used. Its working was fully described in our issue of May 29. Subsidiary signals,



Interior of the new power signal box at Waterloo



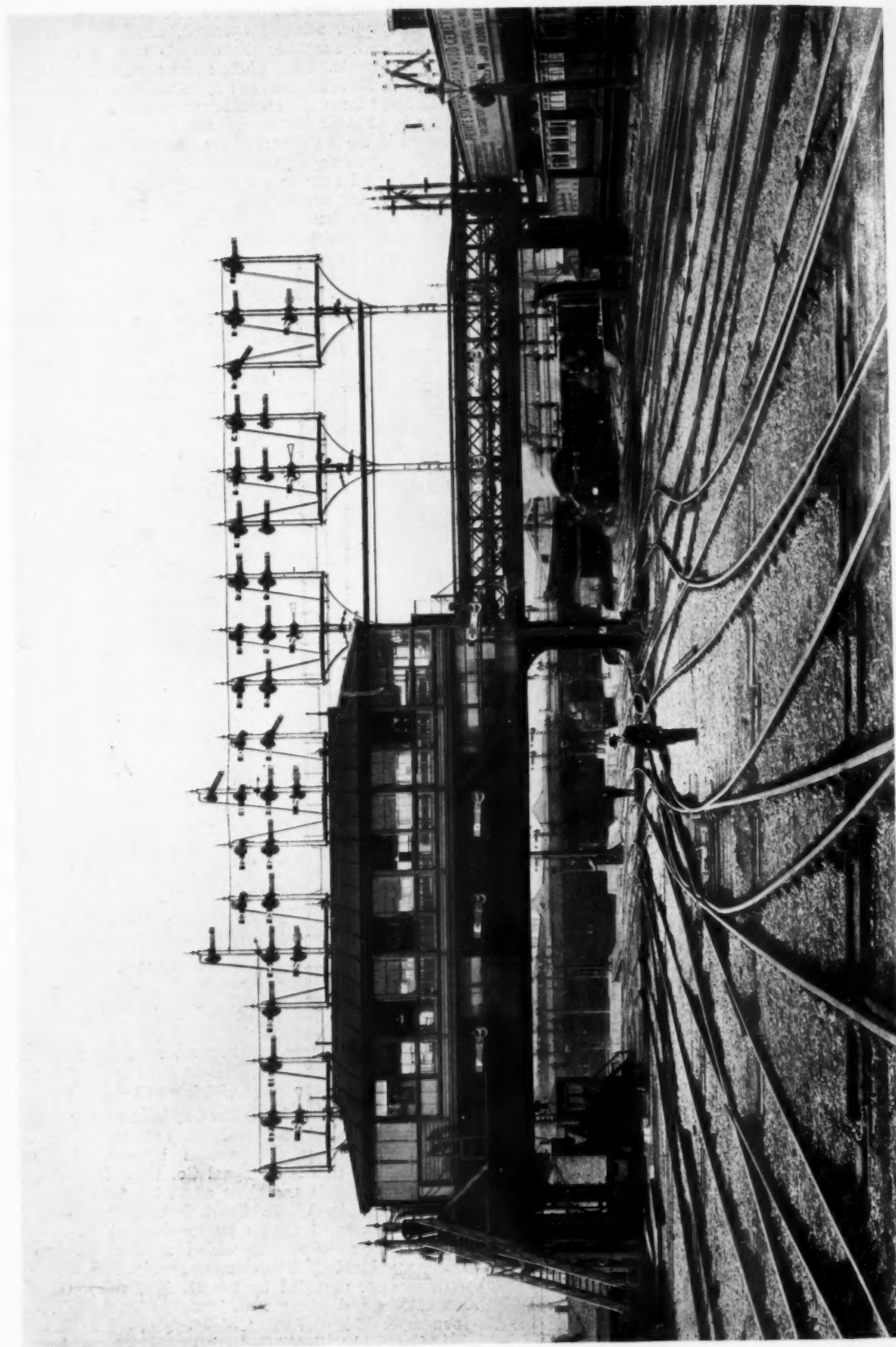
Interior of the displaced Waterloo "A" box

NEW AND OLD WATERLOO SIGNAL BOXES, SOUTHERN RAILWAY



nd approach

Track and signal diagram of Waterloo station



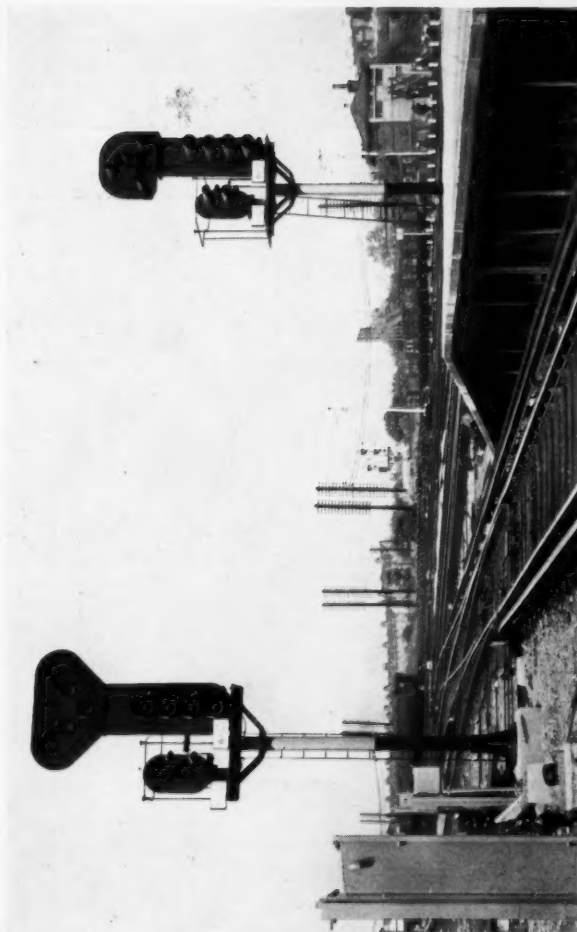
Approach to Waterloo station, L.S.W.R., showing "A" signal box soon after it was brought into use in May, 1892



New and old ("A") signal boxes at Waterloo, Southern Railway



Junction indicator at Queen's Road

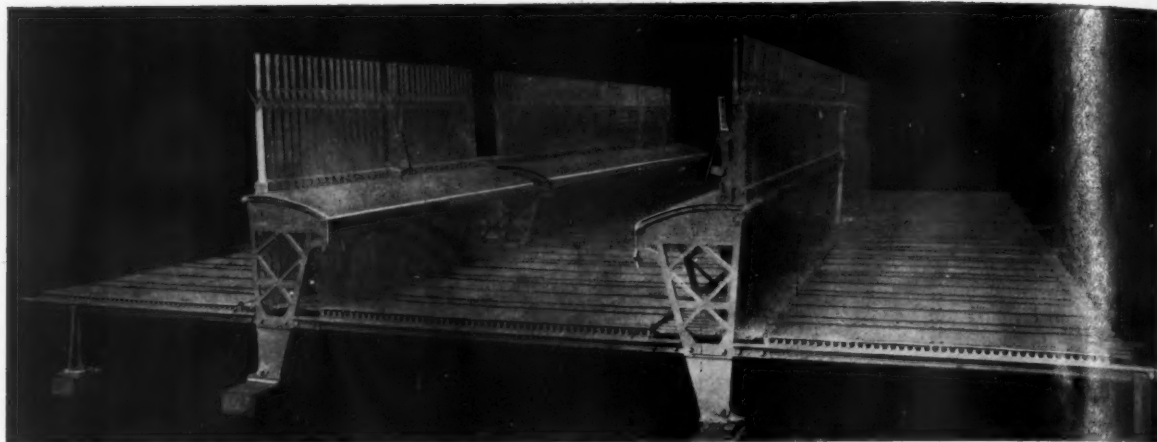


Starting signals and junction indicators at Wimbledon



Solenoid shunt signal and floodlighting unit

NEW AND OLD SIGNALLING, WATERLOO-HAMPTON COURT JUNCTION, SOUTHERN RAILWAY



The 236 lever locking apparatus installed at Waterloo "A" in 1892 after erection in the maker's works. The outer locking boxes each had 40, and the centre 51, channels

Siemens Bros. & Co. Ltd.; W. T. Glover & Co. Ltd.; W. T. Henley's Telegraph Works Limited; Macintosh Cable Co. Ltd.

The entire scheme was designed and installed by the

staff of the Southern Railway Company's Chief Engineer, Mr. George Ellson, to whom we are indebted for facilities to describe the work, and under whose supervision it was carried out.



[Photo]

[United Photographic Press]

British Railway Stockholders' Union luncheon, November 11, at which Sir Robert Horne was the principal guest. (See report on page 811)



[Photo]

[F. A. Scaife Limited]

Luncheon of the Retired Railway Officers' Society on Tuesday last. (See report on page 810)

RAILWAY NEWS SECTION

PERSONAL

Sir Ralph Wedgwood, C.B., C.M.G., Chief General Manager of the London & North Eastern Railway, has been awarded the Order of Jade by the Chinese Government, for his services since 1932 on the Chinese Government Purchasing Commission.

L.M.S.R. APPOINTMENTS

The following appointments have been approved by the directors of the London Midland & Scottish Railway :—

Electrical Engineer's Department

Mr. A. Taylor, Assistant to Area Engineer (Light and Power), Manchester, to be Area Engineer (Central), Manchester.

Scottish Change

Mr. J. Laurie, head office inspector (coaching plant), Operating Manager's office, Glasgow, to be Assistant District Controller, Polmadie.

Chief Commercial and Chief Operating Managers' Departments

Mr. M. H. Sifton, head of section (accommodation, new works and tenancies (goods)), Chief Commercial and Chief Operating Managers' office, Euston, to be Assistant District Goods Manager, Warrington.

Mr. J. Birtwistle, Goods Agent, Oldham, to be Joint Goods Agent, Oldham (L.M.S.R. and L.N.E.R.).

Chief Commercial Manager's Department

Mr. T. Cresswell, District Passenger Agent, Bradford, to be Assistant District Passenger Manager, Leeds.

Mr. T. C. Byrom, Deputy Chief Passenger Rates and Charges Clerk, Chief Commercial Manager's office, Euston, to be Assistant District Passenger Manager, Euston.

Mr. W. N. Roberts, road transport section, Chief Commercial Manager's office, Euston, to be Assistant District Passenger Manager (temporary), Birmingham.

Chief Marine Superintendent's Department

Mr. R. M. Halsall, Master, Clyde Service, Gourcock, to be Ferry Superintendent, Tilbury.

Chief Mechanical Engineer's Department

Mr. D. Williamson, Works Superintendent (Locomotive, Carriage and Wagon), Glasgow, to be Works Superintendent, Horwich.

Mr. W. V. Wood, who, as announced in our issue of October 30, has again been elected Chairman of the Railway Clearing House General Managers' Conference for 1937, has been Vice-President, Finance and Service Departments, of the London Midland & Scottish Railway since January, 1930. He entered

Committee, and was Chairman of it from 1930 onwards. He was formerly elected Chairman of the General Managers' Conference for 1933, and in the following year was Chairman of the Board of Management of the Railway Benevolent Institution. He is also a Member of Council and Vice-President of the Institute of Transport.



Mr. W. V. Wood,
Vice-President, L.M.S.R.,
Elected Chairman, General Managers'
Conference, 1937

the Accountants' Department of the former Belfast and Northern Counties Railway in 1898, but when Government took over control of the Irish railways in 1917, he was appointed Secretary and later a Member of the Railway Accountants' Committee set up by the Irish Railway Executive Committee. On the formation of the Ministry of Transport in 1919, Mr. Wood was transferred to London as Director of Transport (Accounting) and in 1921 was appointed Accountant to the Ministry. In 1924 he returned to railway service as Assistant to the Accountant-General of the L.M.S.R., being appointed Controller of Costs and Statistics in 1927, the position he vacated in January, 1930, to become Vice-President. From 1926 until October last Mr. Wood was a member of the Railway Statistics

INDIAN RAILWAY STAFF CHANGES

North Western Railway

Lt.-Col. R. E. Gordon, M.C., R.E., Divisional Superintendent, Ferozepur, has been appointed Officiating Deputy Agent, Organisation.

Mr. A. K. Muirhead on return from leave has been appointed Controller of Stores.

Mr. W. T. Biscoe, Officiating Deputy Chief Commercial Manager, has been appointed Officiating Divisional Superintendent, Ferozepur.

Mr. V. O. Raynor has been appointed Officiating Deputy Chief Commercial Manager.

Mr. T. C. Hales, V.D., has been appointed Officiating Divisional Superintendent, Rawalpindi.

Mr. E. L. Manico has been appointed Officiating Deputy Chief Operating Superintendent.

Mr. L. E. Brock, Divisional Superintendent, Delhi, has been appointed Divisional Superintendent, Multan.

Khan Bahadur Muzaffar Hussain has been appointed Officiating Dy. Chief Engineer.

Mr. G. J. Eades, on return from leave, has been appointed Deputy Chief Engineer, Signals.

Mr. F. H. L. Strange, V.D., has been appointed Officiating Chief Mechanical Engineer.

Mr. A. Cornish has been appointed Officiating Superintendent of Mechanical Workshops.

Mr. H. H. Cooper has been appointed Officiating Deputy Chief Mechanical Engineer.

Mr. E. H. Keelan, Deputy Chief Mechanical Engineer, has been permitted to retire from Government service as from September 30.

Mr. H. M. Walker has been appointed to officiate as Deputy Chief Mechanical Engineer, as from September 12.

Mr. H. A. Hooks, who, as announced in THE RAILWAY GAZETTE of November 6, has been appointed to be the first District Passenger Manager, Leeds, began his career with the former London & North Western Railway as a clerk at Lime Street station, Liverpool. After four

years in various clerical capacities at a number of stations, he joined the personal staff of the District Superintendent at Liverpool. In April, 1905, under the L. & Y. and L.N.W.R. Agreement, he became L.N.W.R. District Passenger Agent for East Lanca-

which position he now vacates to become District Passenger Manager at Leeds.

Mr. O. F. S. Bender, who, as announced in THE RAILWAY GAZETTE of November 6, has been appointed

the Royal Engineers (S.R.) in 1915, and saw active service in France, upon railway construction works, from that year until 1918. In 1919 he resigned his commission and returned to the G.S. & W.R. as Outdoor Assistant, engaged mainly on dredging works in Rosslare



Mr. H. A. Hooks,

Appointed first District Passenger Manager, Leeds, L.M.S.R.



Mr. O. F. S. Bender, B.Sc. Hons.

Appointed District Engineer, Norwich, L.N.E.R.



Mr. H. F. Sanderson,

Appointed District Goods Manager, Newcastle-on-Tyne, L.N.E.R.



Mr. J. G. McBryde,

Claims and Salvage Agent, Goods Department, G.W.R., 1933-36



Mr. E. W. Higginson,

Appointed Claims and Salvage Agent, G.W.R.



Mr. H. Arnott,

Appointed Assistant Superintendent, North Eastern Area, L.N.E.R.

shire, with office at Burnley, and returned to the staff of the District Superintendent, Liverpool, in May, 1914. In October, 1928, Mr. Hooks became the first L.M.S.R. District Passenger Agent at Preston, and in October, 1931, went to Chester as Passenger Assistant to the District Goods and Passenger Manager at that place. He was promoted to the position of Assistant District Passenger Manager for London in October, 1932,

District Engineer, Norwich, L.N.E.R., was educated at Dulwich College and the City and Guilds of London, Central Technical College, London University; he obtained the diploma of A.C.G.I. in civil and mechanical engineering, and a B.Sc. Honours (London), and is an A.M.Inst.C.E. In 1912 he became a pupil to the late Mr. A. Gordon, Chief Engineer of the former Great Southern & Western Railway (Ireland). During the war he received a commission in

Harbour. Mr. Bender was appointed Assistant District Engineer on the former Great Central Railway at Sheffield in the following year, and in 1931 was transferred, at his own request, to Norwich as Chief Assistant to the District Engineer. Upon the death of Mr. J. B. Willis in 1933, he took charge of the Norwich District, and now continues to hold it as District Engineer. The Midland & Great Northern Joint Railway lines east of

South Lynn have now been added to that district.

Mr. H. F. Sanderson, who, as announced in our issue of November 6, has been appointed District Goods Manager, Newcastle-upon-Tyne, L.N.E.R., has held various positions in the Traffic Department of the North Eastern Area, and for about 18 months was employed in the Chief General Manager's office, at King's Cross. In 1931 he was appointed Commercial Advertising Agent of the L.N.E.R. with Headquarters at Marylebone, and later held the position of Assistant District Superintendent, Stratford, before being appointed District Superintendent, Cambridge, at the end of 1934. Mr. Sanderson commands the L.N.E.R. Operating Company of the Royal Engineers, Supplementary Reserve, and holds the rank of Major in that unit.

Mr. J. G. McBryde, who, as announced in THE RAILWAY GAZETTE of November 6, has retired from the position of Claims and Salvage Agent in the Goods Department of the G.W.R., entered the service of that railway in the same department at Poplar in 1891. After passing through various sections, more particularly specialising in claims work, he was promoted to take charge of the claims section of the District Goods Manager's office at Cardiff in 1914. In January, 1920, Mr. McBryde was attached to the Claims Department of the Chief Goods Manager's office, and after considerable experience in that department, he was promoted to Chief Accounts and General Department Clerk, Chief Goods Manager's office. In the spring of 1933 he was promoted to be Claims and Salvage Agent, the position from which he has just retired.

Mr. E. W. Higginson who, as announced in our issue of November 6, has been appointed to succeed Mr. J. G. McBryde as Claims and Salvage Agent, G.W.R., joined the service of that railway at Plymouth Goods station in 1898, and in the following year was transferred to the District Goods Manager's office at Plymouth. In 1915 he was appointed Goods Agent at Sutton Harbour and six years later went to Frome in a similar capacity. He stayed there but a few months before being promoted to Chief Clerk to the Wolverhampton Goods Agent. In March, 1924, he was appointed Goods Agent at Tyseley, and in the following year was transferred to the Birmingham District Goods Manager's office, where he was placed in charge of various sections in that office before being made Chief Clerk there in 1932. Two years later he was transferred to Paddington as Chief Clerk to the Claims and Salvage Agent. Mr. Higginson is an authority on Railway Law, having for a number of years been the lecturer at the Birmingham College on this subject.

Mr. Henry Arnott, who, as announced in our issue of November 6, succeeds Mr. Arthur Collinson as Assistant Superintendent for the North Eastern Area of the L.N.E.R., began his career with the North British Railway at North Leith station in 1901. After several years' experience in station and district office work, Mr. Arnott was transferred to the Superintendent of the Line's office in Edinburgh when, in connection with the development of the train control system, a headquarters control was set up in that office. Subsequently he held positions in the same office as chief of the passenger train working and timetable section and as Assistant to the Superintendent. In 1929 he went to the North Eastern Area of the L.N.E.R. as Assistant District Superintendent at Hull, and in October, 1931, was appointed to York as Assistant (Trains) to the Superintendent. In 1933, Mr. Arnott returned to Edinburgh as Chief Assistant to the Superintendent, Southern Scottish Area, which position he now vacates to renew association with the North Eastern Area as Assistant Superintendent.

We regret to record the recent death of Mr. O. W. Brain, M.I.E.E., who from 1928 to 1933 was Assistant Railways & Tramways Commissioner in New South Wales. Mr. Brain was born in Gloucester and trained in England, afterwards joining the Crompton Electric Company. In 1896 he became Chief Assistant to the late Mr. P. B. Elwell, Chief Electrical Engineer, New South Wales Government Railways, due to whose illness Mr. Brain had to take charge of the department almost at once. On Mr. Elwell's death in 1899, Mr. Brain succeeded him three months before the opening of the first electric service in New South Wales. He continued to be Chief Electrical Engineer until 1924, when he was appointed Assistant Commissioner for Railways and Tramways, a position he held for about five years. Apart from his departmental activities, Mr. Brain has been consulted in connection with the electrical work of other public bodies. He was Chairman of the Bulk Supply Committee, giving evidence before the Victorian special committees appointed in connection with Melbourne railway electrification, and was a member of the Brisbane Tramways Valuation Board. He also reported upon the power supply system for the tramways of that city. He was a member of the Australian Standards Association and of the Power Supply Committee appointed by the Federal Government.

Mr. Horace J. Young has been appointed Chief Technical Representative and Metallurgist of the Sheepbridge Stokes Centrifugal Castings Co. Ltd. For fifteen years Mr. Young was Chief Metallurgist to the North Eastern Marine Engineering Co. Ltd. of Wallsend-on-Tyne and Sunderland, leaving

there to become a consultant in London. He then joined Hepworth & Grandage Limited, of Bradford, from which firm he has now resigned. In engineering circles his work on cast-iron has been well known over the past twenty years.

Mr. R. Duckworth, who has held the position of Chief of Police, Southern Railway, for the past 13 years, has retired from that position, and has been succeeded in it by Lt.-Col. H. C. Prescott.

At a conference of the chiefs of all the railway police, held at Paddington, a presentation was made to Mr. Duckworth, consisting of a gold wrist watch, together with an eight-day time-piece for Mrs. Duckworth. The presentation was made by Mr. Smith, Chief of Police, London Passenger Transport Board, and he and others present spoke in high terms of Mr. Duckworth's ability as a railway police officer.

Mr. G. Ridley, who has been elected Labour Member of Parliament for the Clay Cross Division of Derbyshire, is Assistant Secretary of the Railway Clerks' Association.

We regret to learn of the death, on October 29, of the Hon. T. C. Norris, a Member of the Federal Railway Commission of Canada.

From *The London Gazette* of November 10:—

Regular Army Reserve of Officers:
Col. (Hon. Brig.-Gen.) F. D. Hammond, C.B.E., D.S.O., late R.E., having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers. (November 10.)

Supplementary Reserve of Officers:
Capt. L. E. Marr to be Major (October 1) and Lt. F. C. C. Stanley to be Captain (October 1).

Brig-Gen. Hammond is a Director of the Rhodesia, Central Africa, Mashonaland, Beira, and Trans-Zambesia Railways and has been Chairman of several committees of enquiry into Overseas railway affairs. Major Marr is District Goods Manager, Middlesbrough, L.N.E.R., and Capt. Stanley is London Suburban District Goods Manager, L.N.E.R.

Dr. G. E. Leguizamon, K.B.E., Chairman, Local Boards, B.A. Great Southern and B.A. Western Railways, returned to Buenos Aires from Europe on October 20.

Mr. G. D. Ramoni, Chief of the Publicity Department, Central Argentine Railway, returned to Buenos Aires on October 17, from leave in Europe.

Mr. M. F. Ryan, C.B.E., General Manager, Buenos Ayres & Pacific Railway, returned to Buenos Aires on October 13, after an extensive tour

through Africa, mainly by air, and spending several months in Europe.

NEW ZEALAND RAILWAY APPOINTMENTS

As a result of considerable increase of late in the work of the Chief Engineer's Branch, New Zealand Government Railways, it has been found necessary to revive the post of Assistant Chief Engineer, which, as a result of the depression, lapsed in 1931 when it became vacant. In consequence the following appointments are announced:—

Mr. H. C. Lusty, A.M.Inst.C.E., Inspecting Engineer in the Chief Engineer's office, to be Assistant Chief Engineer.

Mr. A. H. Murison, A.M.Inst.C.E., formerly District Engineer and since 1933 on the staff of the Chief Engineer, to be Inspecting Engineer.

We much regret that through a printer's error in our first personal paragraph last week Lord Wigram's name was spelt wrongly.

We are sorry to learn that Mr. T. C. Elliott, London Manager of the D.P. Battery Co. Ltd., has been obliged to enter the Royal Masonic Hospital for an operation which will necessitate his absence from business for some time.

We regret to announce the death, on November 1, at Zurich, of Dr. Thomas Percival Berry, M.D. (London), L.R.C.P., formerly Chief Medical Officer of the G.W.R. Medical Fund (Swindon), at the age of 61.

We regret to note the recent death in Canberra of the Hon. Sir Littleton Groom, K.C., formerly Federal Attorney-General and Speaker of the Australian House of Representatives and from 1918-21 Minister for Works & Railways.

Sir George McLaren Brown, K.B.E., who retired from the position of European General Manager of the Canadian Pacific Railway at the end of last month, was received by the King at Buckingham Palace on November 11.

It is with regret that we have to record the death, on November 6, of Mr. John Muir, who was the last Secretary of the Glasgow & South Western Railway prior to its absorption in the L.M.S.R. group. Mr. Muir joined the G. & S.W.R. in 1886 and rose to be Chief Clerk in the Secretary's office in 1893, a position he held until January, 1921. He was then appointed Secretary, and in addition carried on the duties he had assumed in 1913 as Secretary of the Superannuation Fund. As a result of the amalgamation he retired on April 1, 1923, and was 67 years of age at his death.

The Railways' Athletic Association Dinner

There was a record attendance at the seventh annual dinner of the Railways' Athletic Association, held at the Euston Staff Dining Club, N.W.1, on November 6, under the chairmanship of Mr. A. Howie, Joint Accountant, Southern Railway, and Vice-President of the R.A.A. Those present included Mr. and Mrs. A. Howie, Major L. F. S. Dawes, Mr. and Mrs. W. E. Richardson, and Messrs. A. L. Crewe, W. O. Davies, S. C. Edwards, S. J. Marchant, W. G. Pape, A. C. Tapster, E. C. Whitlock, and G. Yorke.

Mr. A. Howie, following the loyal toast, proposed that of "The Railways' Athletic Association," remarking that he was very happy to propose the toast of so well managed, healthy and healthgiving an inter-railway concern. Although the association was only nine years old, it had grown steadily until there were today no fewer than 110 affiliated clubs, and they could safely come to the conclusion that the R.A.A. constituted an important and fruitful advance in the athletic world. He emphasised the interest and good wishes of their vice-presidents, and referred at some length to the interest taken in the R.A.A. by their President, Sir Herbert Walker, who was one of the original founders of the association and of whom it might be said, the better he was known the higher he was esteemed. Prowess in railway athletics was a powerful influence amongst the younger men, continued Mr. Howie, and the directors and officers of the railways took in-

creasing pleasure in supporting athletic clubs for their staffs. A similar policy had been followed by other large scale employers in this country, while this essentially British idea had also been adopted in the Dominions and elsewhere to the great enhancement of the wellbeing of countless employees in the important and staple industries. Physical fitness was a possession beyond price, and the R.A.A. and affiliated clubs were doing their bit in improving the physical condition, both in work and play, of the younger generation, and so carrying on a good and useful work for their country.

Mr. Gerald Yorke, responding to the toast of "The Railways' Athletic Association," referred to the excellent position held by the association on the track and in the field. Without the support of the four group railways and the London Passenger Transport Board, he pointed out, their efforts would be of no avail. He asked the Chairman to inform Sir Herbert Walker that the help so generously given by the railways had been put to good account, and he would like the other vice-presidents to know also how much good their help too was doing, and was appreciated.

Mr. W. T. Oman proposed the toast of "The Chairman," to which Mr. Howie suitably replied. During the evening the prizes and trophies won during the past year were presented by Mrs. Howie, and a musical programme enlivened the intervals between the speeches.

Forthcoming Events

Nov. 13 (Fri.).—Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "High Speed on Railways," by Mr. A. Earley.

Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "Air Transport," by Mr. J. Foster.

Institute of Welding (Midlands), at James Watt Inst., Newhall Street, Birmingham, 7.15 p.m. "A Metallurgical Study of Welding," by Dr. T. Swinden.

Nov. 14 (Sat.).—Permanent Way Institution (Manchester-Liverpool), at Blackburn, 3 p.m. "Construction and Use of Glazed Ware and Drain Pipes, etc., in Building Construction," by Mr. J. Regan.

Nov. 16 (Mon.).—Institute of Transport (Scottish), at North British Station Hotel, Edinburgh, 7.15 p.m. Visit of the President.

Nov. 17 (Tues.).—British Electrical and Allied Manufacturers' Association, at Grosvenor House, Park Lane, London, W.1. Annual Dinner.

Ceramic Society, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 2 p.m. "The Brick in Railway Engineering," by Mr. T. Seaton; "The Selection and Testing of Bricks for Railways," by Mr. L. Rock.

Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Transport in a National Emergency," by Mr. F. Godin.

L.N.E.R. (York) Lecture and Debating Society, at Railway Inst., Queen Street, 6.45 p.m. "The Assam Bengal Railway," by Mr. R. Bliss.

Permanent Way Institution (Scottish), at Royal Technical College, George Street,

Glasgow, 7.30 p.m. "Recent and Probable Development in Permanent Way Work," by Mr. K. Brinsmead.

Nov. 18 (Wed.).—Institute of Transport (Manchester-Liverpool Graduate), at Exchange Station Hotel, Liverpool, 6.30 p.m. "Salesmanship in Railway Goods Working," by Mr. D. Fazakerley.

Institute of Transport (Metropolitan Graduate), at Windsor Castle Restaurant, Victoria, S.W.1. Annual Reunion.

Institute of Welding (Manchester), at College of Technology, 7.30 p.m. "General Design for Welding," by Mr. J. Dorrat.

L.N.E.R. (Newcastle-Sunderland), at Newcastle, 7 p.m. "The Present Economic Position of the North-East Coast," by Mr. E. McCullum.

Nov. 19 (Thurs.).—G.W.R. (London) Lecture and Debating Society, in General Meeting Room, Paddington Station, W.2, 5.45 p.m. "Women's Place in Business. Should it be Extended or Curtailed," by Mrs. B. Gardner.

Institute of Welding (Leeds), at Hotel Metropole, 7.30 p.m. "Structural Welding," by Mr. A. Moon.

Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.45 p.m. Address by the President.

Institution of Mechanical Engineers (Scottish), at University, Edinburgh, 7.30 p.m. Address by the President.

Nov. 20 (Fri.).—Institute of Transport (Leeds Graduate), at City Transport Department, 7 p.m. "The Highway Engineer and Transport," by Mr. F. Lightowler.

Permanent Way Institution (Brighton), at Welfare Room, New England Street, 7 p.m. "Reminiscences of 42 Years' Railway Service," by Mr. G. Kellow.

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Locomotive Working on the Silver Jubilee

(See editorial note on page 777)

In the September 4 issue of THE RAILWAY GAZETTE brief particulars were given of the test runs made from New-castle to King's Cross and back with the Silver Jubilee express, when a maximum speed of 113 m.p.h. was reached on the up journey. The principal interest attaching to these runs was the inclusion in the train, for the first time since its institution in regular service, of the dynamometer car, bringing the tare weight behind the tender up to 254 tons, and the gross weight of the train to 270 tons. Apart from the record speed of the up journey, the more interesting loco-motive performance took place on the down, when the aim was to ascertain how much time the train had in hand on the normal schedule with a strict limitation of the maximum speed to 90 m.p.h., and the extra vehicle added to the load. The engine on the north-bound run was No. 2509, *Silver Link*, driven by W. Sparshatt, whose retirement from the service has just taken place. The accompanying table, compiled by Mr. Cecil J. Allen, who by the courtesy of Sir Nigel Gresley, Chief Mechanical Engineer of the L.N.E.R., was permitted to travel in the dynamometer car, shows in detail the times and speeds of the down run between London and Darlington, together with the boiler pressure, steam-chest pressure, regulator opening, and cut-off. This table serves to illustrate the mastery of the locomotives over this exacting schedule.

It will be seen that the driver normally kept his cut-off fixed at 18 per cent., the only variations being in the start out of King's Cross (65 per cent., gradually reducing to 45 per cent. up the 1 in 105-110 to Holloway, and then 25 per cent. from Finsbury Park to the summit of the lengthy 1 in 200 at Potter's Bar); the recovery from Peter-borough slack (45, 35, and then 25 per cent. to Werrington Junction, which raised the speed in 3 miles from 23½ to 75 m.p.h.); the recovery from Selby slack (35 and 25 per cent. to Riccall, increasing the speed from 32 to 72½ m.p.h. in 4 miles, partly up at 1 in 222); and the recovery from York slack (35 per cent. to Poppleton Junction, and 25 per cent. from there until 70 m.p.h. had been attained about 3½ miles out of York). That is to say, 18 per cent. cut-off sufficed for the whole journey with the exception of about 24 to 25 miles. The full regulator opening was freely used when necessary, to a total of about 104 miles, and so unobstructed is the steam-flow in these engines that the average difference between boiler pressure and steam-chest pressure, with a fully-opened regulator, was about 5 lb.; at one or two points the readings were identical. As regards other parts of the run, the degree of regulator opening may be

Dis- tance miles	Timing Points	Schedule	Actual	Speeds	Boiler Pressure	Steam- chest	Regu- lator	Cut-off.
		min.	min. sec.	m.p.h.	lb./sq.in.	lb./sq.in.		Per cent.
0-0	KING'S CROSS ...	0	0 00	—	240	230	Full	65
1-7	Holloway ...	—	—	38½	225	205	"	45
2-5	FINSBURY PARK ...	—	5 12	—	210	205	"	25
5-0	Wood Green ...	—	7 44	61½	—	—	"	25
9-2	New Barnet ...	—	11 49	63½	210	205	"	25
12-7	Potter's Bar ...	—	15 11	64	215	210	"	18
14-6	Brookman's Park ...	—	16 39	—	220	100	Partly	18
17-7	HATFIELD ...	18½	19 09	81*	—	—	"	18
20-3	Welwyn Garden City ...	—	21 08	78½	220	205	Full	18
23-5	Woolmer Green ...	—	23 38	73	240	170	Partly	18
25-0	Knebworth ...	—	24 55	—	240	135	"	18
27-1	Langley Junction ...	—	26 13	77	—	—	"	18
28-6	Stevenage ...	—	27 45	73	235	185	"	18
31-9	HITCHIN ...	29½	30 21	80½	—	—	"	—
35-7	Three Counties ...	—	32 59	90	245	135	Partly	18
37-0	Arlesey ...	—	33 54	85½†	240	145	"	18
41-1	Biggleswade ...	—	36 46	88½	240	125	"	18
44-1	Sandy ...	—	38 53	81½	235	130	"	18
47-5	Tempsford ...	—	41 17	88½	225	150	"	18
51-7	St. Neot's ...	—	44 21	80½	235	155	"	18
56-0	Offord ...	—	47 39	68½	245	Nil	Shut	18
58-9	HUNTINGDON ...	48½	50 00	76½	215	210	Full	18
62-0	Milepost 62 ...	—	52 28	73½	215	215	"	18
63-5	Abbot's Ripton ...	—	53 40	—	220	205	"	18
67-4	Conington ...	—	56 16	92½	240	90	Partly	18
69-4	Holme ...	—	57 39	85½	—	—	"	18
72-6	Yaxley ...	—	59 56	—	225	120	"	18
75-0	Fletton Junction ...	—	61 53	70½	—	—	Shut	18
76-4	PETERBOROUGH ...	63½	63 46	23½	235	230	Full	45§
79-5	Werrington Junction ...	—	67 39	75	240	235	"	18
81-9	Helpston ...	—	69 29	81½	—	—	"	18
84-8	Tallington ...	—	71 33	90½	240	235	"	18
88-6	Essendine ...	—	74 08	86½	240	235	"	18
92-2	Little Bytham ...	—	76 38	85½	242	240	"	18
93-0	Milepost 93 ...	—	77 12	84	—	—	"	18
94-0	Milepost 94 ...	—	77 56	80½	—	—	"	18
95-0	Milepost 95 ...	—	78 41	79	—	—	"	18
96-0	Milepost 96 ...	—	79 27	78½	—	—	"	18
97-1	Corby ...	—	80 17	80½	245	240	"	18
98-0	Milepost 98 ...	—	80 59	78½	—	—	"	18
99-0	Milepost 99 ...	—	81 46	76	—	—	"	18
100-1	Stoke Summit ...	—	82 39	75	245	240	Partly	18
102-0	Great Ponton ...	—	84 08	79½	245	50	"	18
105-5	GRANTHAM ...	87½	86 55	63½	245	235	Full	18
109-7	Barkstone ...	91	90 36	78½	240	130	Partly	18
111-5	Hougham ...	—	91 58	85½	240	210	"	18
115-4	Claypole ...	—	94 41	88	240	110	"	18
120-1	NEWARK ...	99½	98 08	81½	235	125	"	18
123-0	Bathley Lane ...	—	100 36	69½	—	—	Full	18
126-4	Carlton-on-Trent ...	—	103 16	81½	—	—	"	18
127-4	Crow Park ...	—	103 59	84	235	225	"	18
131-3	Dukeries Junction ...	—	106 51	76½	—	—	"	18
131-9	Tuxford ...	—	107 22	76	230	210	"	18
133-7	Markham Summit ...	—	108 46	75	230	110	Partly	18
135-5	Ganston ...	—	110 10	83½	240	50	"	18
138-6	RETFORD ...	114½	112 33	71½	245	230	Full	18
141-7	Sutton ...	—	115 03	84	—	—	Partly	18
143-9	Ranskill ...	—	116 37	87½	240	125	"	18
145-8	Scrooby ...	—	118 00	66½	240	230	Full	18
147-7	Bawtry ...	—	119 43	—	230	225	"	18
149-5	Milepost 149½ ...	—	121 19	67	—	—	"	18
151-3	Rossington ...	—	122 47	81	240	60	Partly	18
153-2	Black Carr Junction ...	—	124 13	78½	—	—	Shut	18
156-0	DONCASTER ...	128½	126 40	67½	240	230	Full	18
158-1	Arksey ...	—	128 27	79	240	210	"	18
160-2	Shaftholme Junction ...	132½	130 11	69½	215	210	"	18
163-0	Moss ...	—	132 31	77½	215	210	"	18
166-0	Balne ...	—	134 42	84	235	225	"	18
167-3	Heck ...	—	135 38	84	—	—	"	18
169-8	Templehirst ...	—	137 23	86½	240	160	Partly	18
173-0	Brayton Junction ...	—	139 47	87½	—	—	Shut	18
174-4	SELBY ...	144	141 18	32½	240	225	Full	35
175-2	Barby Junction ...	—	142 30	—	240	225	"	25
178-5	Riccall ...	—	145 49	72½	235	225	"	20
181-1	Eserick ...	—	147 53	80½	230	220	"	18
184-0	Naburn ...	—	149 59	82½	215	210	Partly	18
186-2	Chaloner's Whin Jc. ...	—	152 03	53½	235	225	Full	25
188-2	YORK ...	156½	154 38	27½	235	210	Shut	25
189-8	Poppleton Junction ...	—	156 56	60	220	215	Full	35
193-7	Beningbrough ...	—	160 27	72½	225	145	Partly	18
199-4	Aine ...	167½	165 18	70½	235	145	"	18
201-6	Raskelf ...	—	167 11	71½	235	160	"	18
204-3	Pilmoor ...	—	169 29	71	235	190	"	18
206-2	Sessay ...	—	171 05	72½	245	150	"	18
210-4	THIRSK ...	177	174 38	71	240	160	"	18
214-8	Otterington ...	—	178 18	69½	235	220	Full	18
218-2	NORTHALLERTON ...	184	181 15	71	—	—	"	18
221-9	Danby Wiske ...	—	184 28	66½	235	220	"	18
225-4	Cowton ...	—	187 28	72½	220	210	"	18
227-1	Eryholme ...	192	188 56	69	220	150	Partly	18
229-7	Croft Spa ...	—	191 09	72½	—	—	Shut	18
232-3	DARLINGTON ...	198	194 43	—	—	—	"	18

* Maximum at 18½ milepost. † Minimum at Langford (38½ miles). ‡ Maximum at 87 milepost. § Reduced to 35 per cent. at New England (77½ miles), and 20 per cent. at Walton (78½ miles). || Speed reduced for water-troughs. ¶ Service slack for curve.

gauged by the reduction in steam chest pressure.

The most remarkable exploit of the locomotive was the ascent to Stoke Summit, where full regulator and 18 per cent. cut-off was used throughout. Over the slight undulations from Werrington Junction to the 87 milepost speed rose to 90 m.p.h.; $1\frac{1}{2}$ miles up at 1 in 264 to Essendine reduced it to 86 $\frac{1}{2}$ m.p.h., followed by 88 on the two miles of undulations to milepost 91. Up 4 $\frac{1}{2}$ miles at 1 in 200 to milepost 95 $\frac{1}{2}$ there was a gradual fall to 78 $\frac{1}{2}$ m.p.h., with a recovery to 80 $\frac{1}{2}$ on the two miles of level and 1 in 330 up past Corby station. The final 3 miles at 1 in 178 reduced the speed from 80 $\frac{1}{2}$ to 75 m.p.h., at which rate Stoke Summit box was passed. Throughout the climb the boiler was practically at blowing-off point, and the indications were that steam could have been supplied for an indefinite period at this rate, had it been necessary. North of York, in conformity with the general restriction through the automatically-signalled area, speed was kept carefully at just above the 70 m.p.h. mark, and the engine maintained this speed on the faintly rising grades with the regulator closed sufficiently to produce a steam-chest pressure of 145 to 160 lb.

Scrupulous observance of service slacks was a notable feature of this run; in addition to the severe slacks through Peterborough, Selby, and York, there were three slowings to take water, and six other service slacks, making twelve reductions of speed in all. From Brookman's Park to Brayton Junction, Selby, a distance of 158.4 miles, the time occupied, with all slacks included, was 123 min. 8 sec., giving an average speed of 77.2 m.p.h., and 130 miles of the journey, or well over one-half, were covered at an average of 80 m.p.h. In the first hour from King's Cross the train covered 72.7 miles; in two hours from the start 148.0 miles had been covered; and in three hours 216.8 miles. From the running throughout it was clear that, notwithstanding the addition of over 15 per cent. to the normal load, the engine had plenty of reserve in hand; without the limitation of maximum speed to 90 m.p.h., also, the running time might without difficulty have been further reduced.

WROUGHT IRON CRANE CHAINS.—A revised British Standard Specification for short link wrought iron crane chains has recently been issued (No. 394—1936). Two important changes have been made in the specified requirements, the first that the elongation under test load for the "special" quality has been increased, and the second that all testing and examination is now to be carried out at a public test house licensed by the Board of Trade (commonly known as Lloyds Proving House). Copies can be obtained from the British Standards Institution, 28, Victoria Street, S.W.1, price 2s. 2d. post free.

THE MONTH'S RAILWAY LAW

Railway Cases at Michaelmas

The business for the Michaelmas Law sittings was resumed on Monday, October 12, and the new legal year was heralded by the usual procession of judges up the great hall of the Law Courts, headed by the Lord Chief Justice in the absence of the Lord Chancellor (owing to illness). The number of appeals shows an increase as compared with last years, but there is considerable falling off in the King's Bench list. In the House of Lords the case of *Alderman v. Great Western Railway Company* stands for hearing. In the Court of Appeal there are two railway appeals in *Jones v. London & North Western Railway Company* from a judgment of Mr. Justice Charles at York last term, and the *Great Western Railway Company v. Chamber of Shipping of the United Kingdom*, an appeal by objectors from an order of the Railway Rates Tribunal. There is also a County Court appeal—*Tolley v. Southern Railway Company* from Canterbury County Court, and *Blee v. London & North Eastern Railway Company*, an appeal in a workmen's compensation case from Clerkenwell County Court. Apart from two or three claims for damages for personal injuries the lists in the King's Bench Division do not contain any cases of interest to railway companies.

The Bouts-Tillotson Transport Case

On October 19 the licensing authority for the Metropolitan traffic area gave its decision, the effect of which is to reduce the number of vehicles on the applicants' licence by the number which had not been in regular use. The number is thus reduced from 139 motor vehicles to 128, and from 56 trailers to 42. The railway companies opposed the application on the ground that the goods could be carried by rail, with few exceptions, on long distance trunk services. With this contention Mr. Gleeson Robinson agreed, but he thought that it would be premature to refuse a renewal of all the licences at the present time. He added: "The conditions of unfair competition between road and rail transport which existed before the Road and Rail Traffic Act, 1933, have already been improved to some extent. It is to be anticipated that with time, and with improved methods of enforcement, they will collectively exercise in the future a greatly increased influence on the competition to which rail transport has been subjected in the past. The operators of rail transport have not yet had an opportunity to recover from the paralysing effect of the wasteful competition to which they were subjected at a time of industrial depression, or even thoroughly to bring to the notice of the public and of trading concerns the improved facilities which they can

already offer." These words should have a heartening effect upon those who have been endeavouring to perfect the system of transport by rail and to bring it up to date.

A Railway Shunter's Accident

(*Solicitors Journal*, October 10.)

In *Mellor v. London Midland & Scottish Railway Company*, His Honour Judge Longson heard a claim by a railway shunter for compensation under the Workmen's Compensation Act. Mellor was pushing trucks from a siding on to the main line to make up a train, when the accident occurred. He was riding on a shunting pole beside the second wagon, when he was knocked off at the switch point by a lever which was lying the wrong way. His left ankle was fractured and his right leg had to be amputated. The company's defence was that Mellor was not employed for the purpose and that his duties were mainly clerical, so that the accident did not arise out of his employment. They also said that it was too dangerous to ride on a shunting pole and such conduct being unreasonable was only an added peril. The learned judge upheld the view that Mellor was not engaged to couple or uncouple wagons. He was however, said the judge, entitled to call himself an assistant shunter, and so the work was in the course of his employment. The practice of riding on a shunting pole was not unknown and was not grossly negligent. An award as for total incapacity was therefore made in his favour.

Use of Return Tickets

The holiday season produced the usual crop of small cases as to delay in transport and other ticket conditions. In a recent case in the Stratford-on-Avon county court (*Solicitors Journal*, September 12) the London Midland & Scottish Railway Company sued a passenger named Flowers for 16s. 8d., the difference between the cost of a single fare at 1 $\frac{1}{2}$ d. a mile and the return fare at a 1d. a mile from Sheffield to London. Flowers had travelled by the old Midland route via Leicester and Kettering to London, using the return halves of two tickets. One was a London Midland & Scottish ticket from Sheffield to Birmingham, and the other was a Great Western ticket from Birmingham to London. The Great Western line does not touch Sheffield and it was contended for the company that the defendant had broken the condition which provides that "the passengers holding ordinary return tourist and monthly return tickets (covering places served by both lines) are allowed to travel on the return journey between such places." For the defendant reliance was placed upon an advertisement by the company that the tickets were available by any

route going North and it was said that this entitled him to break his journey. His Honour Judge Drucquer held that the words in brackets in the condition meant that the termini must be served by both lines. Here Sheffield was not served by the Great Western company, and the licence to break the journey did not apply, so that the defendant had travelled without a proper ticket and the company was entitled to the sum claimed.

Rate Fixed by Tribunal

Great Western Railway v. James and Hodder (Vol. 24. Traffic cases p. 241).

The Railway Rates Tribunal had here given its consent to the company charging an exceptional rate for copper cast from Birmingham to Bristol which was 61 per cent. below standard. The company however inserted in its rates book a rail charge which was 53 per cent. below standard. The Railways' Act, 1921, section 32, says that the standard charges shall be those which the company is entitled to make for all services rendered, and that no variation shall be allowed upon them unless an exceptional rate is "continued granted or fixed under part III of the Act." The company claimed from the

defendants the rate entered in the rate book, but the traders claimed to pay the lower rate allowed by the tribunal. The case turned on the meaning of the word "granted," as to which the Act contains no definition. The Tribunal held that "granted" must mean granted by the company, and that for a new exceptional rate more than 40 per cent. below standard "consent" is required. Where the exceptional rate is not more than 40 per cent. below standard no consent is necessary, but the rate must be reported to the Minister of Transport. In the case of exceptional fares, Sect. 41, sub-s. 1 enables the company to charge below standard, but here again the reduction must be reported to the Minister. The company has no power under the Act to grant exceptional fares, but only to charge them. The words "grant" and "charge" therefore appear to mean the same thing, that is, to put into operation. The insertion of a rate in the rate book will only bring the rate into force if consent has been obtained; otherwise it is a nullity. Here the company had never validly granted the rate 53 per cent. below standard, because, although it had entered it in the rate book, it was more than 40 per cent. below standard, and could not be

granted without the consent of the Rates Tribunal which had not been obtained. The Tribunal had sanctioned the particular rate at 61 per cent. below standard, and it did not follow that it would have sanctioned the other rate. The rate which the company sought to charge was therefore invalid, and as the rate 61 per cent. below standard had not been entered in the rate book, that rate was also inoperative, and the trader could not claim to have his goods carried at the rate 61 per cent. below standard.

Motor Vice Horse

Richard Jones v. Roberts and Owen (Vol. 24. Traffic cases, p. 287).

The appellant here argued that under the Road and Rail Traffic Act, 1933, sect. 6 (2), the licensing authority was bound, as of right, to grant an A licence when it was shown that the applicant had substituted a motor vehicle for a horse-drawn vehicle. The Appeal Tribunal rejected this contention. Substitution, in its judgment, was a matter to be taken into consideration by the licensing authority in the exercise of its discretion, but gave no arbitrary right to demand a licence and imposed no obligation on the authority to grant one.

Railway Convalescent Homes' Family Dinner

On Saturday last, November 7, the family dinner of the Railway Convalescent Homes was held in the Wharcliffe Rooms, Hotel Great Central, Marylebone, under the presidency of Mr. Robert Holland-Martin, C.B., Chairman of the Southern Railway Company. The guests included:—

Messrs. R. Stiles Allen, J.P. (the Mayor of Marylebone), P. Anstey, F. C. Buller, R. Carpmacel, A. L. Crewe, H. Adams Clarke, A. D. Cook, H. S. Chapman, W. Challis, O. Cromwell, R. G. Davidson, J. Dunkley, G. Ellison, O.B.E., Ernest E. Evans, W. Every, C. E. Fairburn, M.A., W. Forsey, A. Hubble, H. Ireland, A. Kinselle, J. F. Lean, J. B. L. Lindsay, E. A. Lees, James McLaren, W. Geo. Pape, O.B.E., E. Stone, F. B. Simpson, M.P., G. H. Snow, W. J. R. Sqaunce, T. Smith, M.B.E., and A. T. Tapster.

Those of the Board of Trustees of the Railway Convalescent Homes present were:—

Messrs. F. W. Wheddon (Chairman), W. F. Smith (Deputy Chairman), R. W. J. Canham, F. C. Holder, R. E. Lyon, Percy Randall, F. T. Roach, G. H. Taylor, W. Tyrrell, and J. Whyte; and Mr. H. Haigh, Secretary.

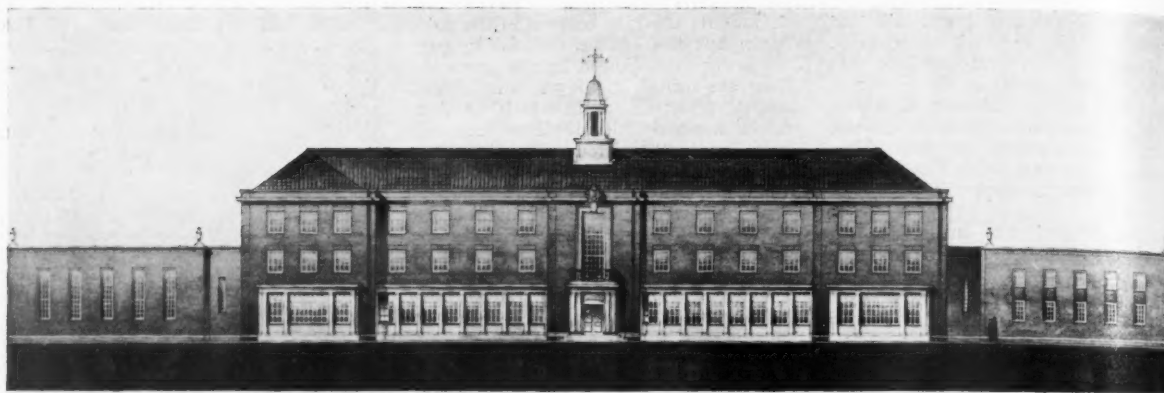
Mr. George Ellison, Chief Engineer of the Southern Railway, proposed the toast of "The Railway Convalescent Homes." Describing the organisation as a movement worthy of every support, he recalled that in its early days, some 37 years ago, it was nearly shipwrecked, and even Mr. Passmore Edwards thought it would be better to give up and hand over the original home to a London hospital. Mr. Ellison contrasted that period with the present time when the movement has the support of all the railway companies and

all the railway trade unions, and has available eight homes that are freehold property and without outstanding debts. Some of the buildings, he said, were of both architectural and historic interest, and instanced Lavenham, Suffolk, for which they were indebted to H.R.H. Princess Louise. Turning to the financial side, Mr. Ellison pointed out that the minimum weekly membership subscription of 1d. amounted to a contribution of but £4 6s. 8d. during an average working life; the average cost of a patient passing through the Homes was approximately £6. The present total membership in round figures was 350,000, and the income of the Homes about £40,000 per annum. The collection of the weekly 1d. through the paysheets was a great boon, and one for which the movement was duly grateful to the railway companies. New members were wanted, however, and efforts should be made to avoid the low cost of membership resulting in the movement being regarded with the same sort of suspicion as was the man who tried (unsuccessfully) to sell sovereigns on London Bridge at 2d. each.

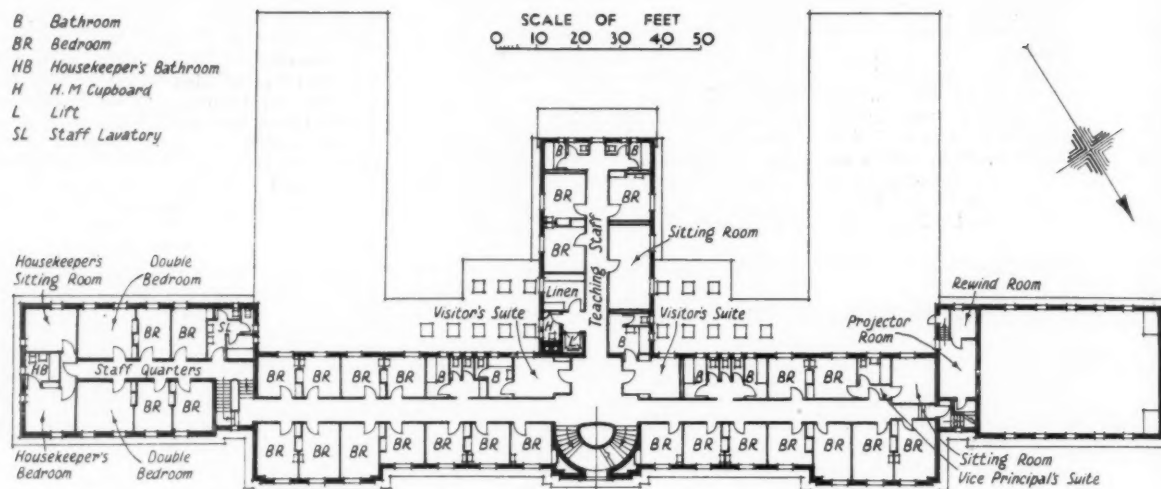
Mr. Holland-Martin, in reply, said he saw in the Railway Convalescent Homes more even than provision for convalescence, for the work brought railwaymen together to further a common cause, and in an appeal like that of the R.C.H. railwaymen were as one man. He congratulated Mr. Ridley on having the previous day won his parliamentary seat at Clay Cross for, despite

not always seeing eye to eye politically, it was gratifying to know that a first-class railwayman was going into Parliament. The aim of the R.C.H. should be to bring its total membership up to 550,000, with a consequent annual income of £60,000. Then it might be considered whether the minimum subscription could be increased to 1d. a week so as to raise £120,000 per annum and enable the work to be extended considerably. At present there were eight homes, five for men and three for women, and he would like to see the number increased—a society like that could only go forward. Finally, Mr. Holland-Martin voiced the thanks due to the committees for the work they did (there were present members from places as far apart as Aberdeen and Cornwall), and to the matrons for carrying on such a worthy work.

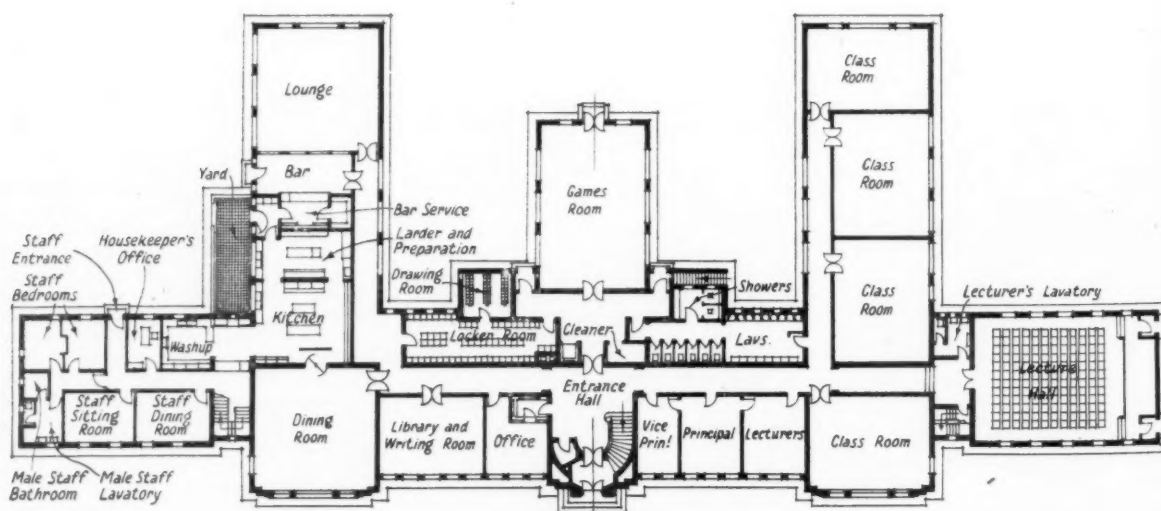
PRECAST CONCRETE KERBS.—The British Standards Institution has just issued a revision of B.S.S. No. 340 for precast concrete kerbs, channels, and quadrants. Specific requirements relating to the details of manufacture, as, for example, the composition of the mixture, nature of the moulds, methods of moulding, and period of maturity are omitted. Another change relates to the standard sections of the kerbs, and the specification has also been modified in respect of the loads to be supported in the transverse test. Copies may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1; price 2s. 2d., post free.



An artist's impression of the front elevation of the college building



FIRST FLOOR PLAN



GROUND FLOOR PLAN

PROPOSED L.M.S.R. STAFF TRAINING COLLEGE AT DERBY

L.M.S.R. Derby Staff College Scheme

Last week we announced the proposed establishment of a staff college at Derby, and gave a brief outline of its objects and scope. Now, however, we are able to describe more fully the whole scheme as outlined by Sir Josiah Stamp and expanded by Mr. Lemon and Mr. Wood.

The college will be of a residential character accommodating fifty members of the staff for periods of training from a fortnight upwards, and they will receive instruction in the best practices of railway work. The centre will not cut across any existing educational facilities provided at evening classes, technical colleges or the universities. It is primarily for the inculcation of the best ideas known on railways in this country and throughout the world; for example, for the training of men who possess qualifications necessary as leaders either in the motive power section, as station-masters, goods agents, or traffic controllers, and covering all the various departmental activities carried on by the railway.

In order to prevent the college becoming too academic, talks will be given by practical men who are already holding positions of responsibility, and a panel of suitable men will be created and drawn upon from time to time, so that those selected will not be away from their regular work for too long a period, and there will also be a constant flow of practical ideas into and out of the college and a regular flow of interchanged ideas.

The fundamental idea is that the men shall be trained at a boarding staff college rather than at what might be termed a day college, so that they can work and play together, a practice which will tend to break down the departmental outlook which exists today and which is a potential danger in all big organisations. Many men owe their success in life to the fact that they were lucky enough to receive their training under extraordinarily good men, and the process of the proposed type of training will reduce the luck and increase the certainty of future railway work.

Moreover, in the railway industry there has occurred a great loss of valuable knowledge and experience through its not being recorded before men retired from the service, and one of the objects is to ensure that text books shall be prepared incorporating all the best practices. In any branch of science such as chemistry or engineering there is no lack of text books from the earliest times, including particulars of negative and positive experiments, and a student commencing a scientific training has the best knowledge available. The non-engineering work of railways has not had the same attention paid to it in this respect, and it is felt that such knowledge should be recorded and be available to every

member of the L.M.S.R. staff so that everyone in the service will have an opportunity of equipping himself for promotion right through to the top.

These additional activities of the L.M.S.R. will be coupled up with the use of the cinema and instructional films which are already in operation.

The Vice-Principal of the college will probably be a district officer who has won his spurs in the ordinary channels of railway work. This will introduce the practical element into the scheme, and the arrangement will be for the Vice-Principal to be changed, say, every two years, his work at the college becoming one of the steps in the promotion of officers to higher ranks. The Principal will be a man who has had experience of organising technical instruction in its widest sense.

Derby has been selected for a site of the college because of the railway activities centred there, and its accessibility to all parts of the L.M.S.R. system. The presence there of the locomotive and carriage works, marshalling sidings, control offices, and research laboratories, will enable the students training at the college to become acquainted with actual workings by practical demonstrations, and acquaintance at first hand with the difficulties which normally arise.

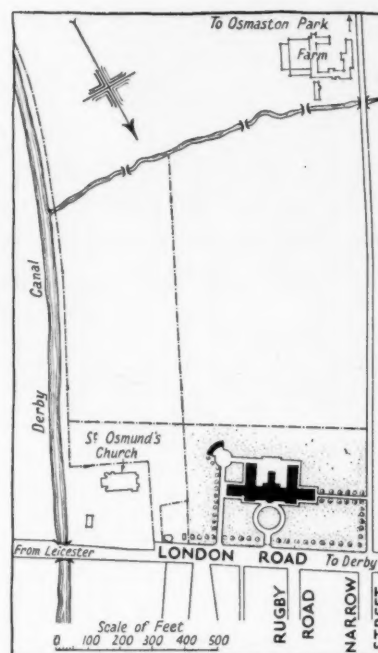
In brief, the essence of the scheme is that the best practices and the best traditions of the older experienced men shall be imparted to the younger members of the staff for their benefit during the remainder of their railway service.

Facilities for games and recreation will be provided at the college, together with a fully-equipped cinema, where films, directed and produced by the railway and dealing with various aspects of railway working, can be shown as part of the training or in addition to it.

The site of the new college building is at Osmaston Park, Derby, and it has been specially designed for the purpose by Mr. W. H. Hamlyn, the company's Architect. Ample space will be afforded in the grounds for making provision for all kinds of outdoor sports. The accompanying illustrations give a clear idea of the position and layout of the new building, which, though facing London Road, is set back 200 ft. from it, thus excluding traffic noises. The forecourt will be laid out with turf and shrubs, and the recreation grounds will be at the back and sides. A few further notes on this subject will be found in an editorial note on page 775.

Architectural Features

The plan of the building is symmetrical, and is divided mainly into three sections, one containing four large classrooms and a cinema lecture theatre. Each classroom will accommodate 15 students and the lecture room will seat 150 persons.



Site plan of proposed L.M.S.R. staff college at Derby

The central portion of the plan embraces administrative offices, including rooms for the Principal, Vice-Principal, clerk's office and tutors' common room. The remainder of the plan is laid out as a social and domestic centre, and includes for the use of students, dining room, lounge and large games room, adjacent to which are locker rooms, drying rooms, lavatories and shower baths. Adjoining these rooms are the kitchens, larders, sculleries, servery, housekeeper's office and dining and sitting room for the domestic staff.

The two upper floors are planned to accommodate bedrooms for approximately 50 students, together with special rooms for resident tutors, visiting lecturers and others, a tutors' sitting room, and a suite of rooms for the Vice-Principal. There is also a small block of bedrooms disconnected from the main bedroom accommodation for the use of the staff, and in this block is a small suite for the housekeeper comprising bedroom, sitting room and private bathroom.

The architectural elevations of this imposing new building, one of which is shown in our illustration opposite, are designed in the Georgian style slightly modernised to suit the utilitarian requirements of the building. The elevations will be faced with brick and stone together, whilst certain features will be of wood reminiscent of the Georgian style which in America is known as "colonial," and has been largely adopted with much success in some of the principal recent collegiate and scholastic buildings in that country. The architectural treatment adopted lends itself admirably to this type of building, enabling a dignified

result to be attained without an extravagant expenditure on cost.

With regard to the interior of the building, it is the intention to treat this in a simple manner suitable to a building of this type. No unnecessary ornamentation will be incorporated, but it is hoped that satisfactory results will be achieved by the use of plain walls, correct colour treatment, and

plain but artistic equipment and furniture. Nothing will be introduced that is likely to distract the minds of students from their studies. The building will be heated from a centrally located plant and the question of adequate ventilation is being considered, together with the most up-to-date forms of lighting suitable for a building of this kind.

The plans, some of which we reproduce on page 808, are preliminary and require certain developments and amendments, but sufficient is indicated to reveal the proposal to produce at a reasonable cost an efficient internal layout together with an architectural treatment that expresses in a pleasing manner the character and purpose of the building.

Retired Railway Officers' Society Luncheon

(See illustration on page 800)

The half-yearly luncheon of the Retired Railway Officers' Society was held at the Abercorn Rooms, Liverpool Street Station Hotel, E.C.2, on November 10, with the President of the society, Mr. G. G. Senior, in the chair. The principal guest was Mr. R. Holland-Martin, C.B. (Chairman of the Southern Railway), and among others at the Chairman's table were Sir Nigel Gresley, Sir Lionel Warner, Lt.-Col. Gilbert S. Szlumper, and Mr. W. V. Wood. The following is a list of those present:—

Messrs. A. W. Arthurton, R. G. Barefoot, C. Bassage, A. R. Bell, A. H. Bull, W. Bishop, E. F. Bone, W. E. Bradbury, W. P. Bradbury, J. F. Bradford, A. J. Brickwell, F. S. Bridge, J. F. Brook, R. Brown, H. J. Burcham, H. R. Campfield, S. B. Carter, A. L. Castleman, R. F. Castleman, G. J. Chesters, E. A. Clear, Major Clear, Messrs. G. Cole Deacon, R. G. Davidson, F. W. Dingley, P. J. Dowsett, H. W. C. Drury, W. D. Duffield, Alex Eddy, C. A. Everard Greene, H. Ferguson, Major G. N. Ford, Messrs. J. F. Gee, R. G. Gibson, E. Golbourn, Sir Nigel Gresley, Messrs. H. J. Guest, W. E. Hart, E. B. Hassall, C. G. Holland-Martin, R. Holland-Martin, H. E. Horne, A. Howie, G. Hughes, Lt.-Col. H. A. Hull, Messrs. W. H. Hyde, R. J. M. Inglis, T. H. Jacobs, R. Jansen, W. A. Jepson, S. F. Johnson, J. A. Kay, D. R. Lamb, F. W. Lampitt, J. W. Lovejoy, D. McCulloch, J. MacLaren, Dr. MacMahon, Captain R. T. Massam, Messrs. E. W. Mauger, A. Maynard, W. A. Messer, Lt.-Col. P. D. Michod, Messrs. A. S. Mills, E. J. Missenden, A. E. Moore, Sir Charles L. Morgan, Messrs. J. R. Morris, G. Morton, S. L. Murgatroyd, C. H. Newton, R. H. Nicholls, A. Oldham, E. E. Painter, A. P. Parker, C. P. Parker, L. P. Parker, T. Peacock, A. H. Pepper-corn, W. F. Pettigrew, J. Pike, F. R. Potter, D. Poyntz Ricketts, E. Prebble, J. Probert, J. Procter Smith, C. A. Roberts, H. E. Roberts, A. Robertson, J. B. Rogers, A. P. Ross, J. Roughton, T. W. Royle, H. J. Rudgard, F. Ruffell, F. A. Sargent, G. G. Senior, J. Shearman, T. H. Shipley, T. Smith, W. J. Smith, D. Spooner, Lt.-Col. G. S. Szlumper, Messrs. M. C. Tait, A. Tatlow, E. Taylor, W. A. Thomas, H. Thompson, H. L. Thornhill, Major W. E. Thornhill, Messrs. J. Tipton, R. H. Todd, W. Townend, A. Twist, W. T. Venton, A. Walker, Sir Lionel Warner, G. F. Warriner, Major H. A. Watson, Messrs. F. E. Wentworth-Shields, E. Wharton, P. Wharton, H. Wheeler, A. W. Willet, J. Williams, J. J. Wilson, W. V. Wood, W. Yates.

The President, after giving the loyal toast, proposed "the Guests," saying that they had with them a great number of distinguished railwaymen, as well as others connected with different transport industries. He extended a hearty welcome to their principal guest, Mr. Robert Holland-Martin. It gave them great pleasure to entertain the Chairman of the Southern Railway, because of the splendid way in which that company had treated the society on the

occasion of its visit to Southampton and inspection of the docks.

Mr. R. Holland-Martin, responding on behalf of the guests, thanked the President for his very kind welcome. He was proud to be at such a gathering of men who had brought the railways to the pitch at which they were today. Their successors hoped to hand on railways as efficient as those they had inherited. Railway development had enabled all classes of the population of London to move outwards, and railways could have something to say in preventing that development from spoiling the country. They might be proud of their achievements in moving the population, but ages to come would curse them if they did not direct that movement to pleasant surroundings, and leave posterity some of the beauties of the countryside.

A new aspect of travel now to be tackled was that arising from the Coronation year. So many people were coming to London that he really wondered how they were all to be moved and housed. This interest in England would not be a transitory phase, nor confined to London, for not only in our Empire, but throughout the Continent, people were expressing the desire to see for themselves the various parts of the British Isles.

Sir Nigel Gresley proposed the toast of "Success to the Retired Railway Officers' Society." He did so with all sincerity, for he was now approaching the age at which the success of the society became a matter of personal interest to him. Its members seemed to live so long and look so well, that to join it might be regarded as a form of life insurance.

Mr. W. V. Wood, seconding, said he wished to refer in particular to Mr. A. J. Brickwell and Mr. H. J. Burcham for their work in connection with rating relief for railways. Seventy-five years ago a commission had recommended that certain steps should be taken, and for bringing these to fruition at the present time the gentlemen he had referred to might be considered largely responsible.

Lt.-Col. Sir Charles L. Morgan replied to the toast. Mr. Holland-Martin, he said, had expressed some apprehension at the thought of handling the crowds of the Coronation year. He would like to offer on behalf of the society to come in and help, and he

thought that members' early training would enable them to teach something even to the railwaymen of today.

Lt.-Col. Gilbert S. Szlumper proposed the toast of "the President." Nobody knew better than himself and Sir Herbert Walker what yeoman work Mr. Senior had done as Staff Assistant during the war. His help to the Railway Executive Committee on Staff Matters had been of outstanding importance. All present looked upon him as the soul of geniality, a good citizen, and an admirable President.

Mr. R. H. Nicholls seconded with one of his speeches of humorous commentary and reminiscence which are becoming a feature of this function. Expressing his indebtedness to THE RAILWAY GAZETTE as the source of his present knowledge of railway affairs, he congratulated Mr. F. R. Potter, the recently appointed Superintendent of the Line, G.W.R., upon the fact that in three months the price of the company's ordinary stock had gone up ten points; his admiration of the new L.M.S.R. staff college scheme at Derby was qualified by some doubts as to the practicability of "making railwaymen in a fortnight." He referred to the President's long railway experience, his activities in local affairs and hospital work, and his excellent work for the society. He wished him many years of health and happiness.

The President, replying, said that the attendance at the luncheon was a record. These were unsettled times, and he would like to assure the railwaymen present that whatever situation should arise, the help of the society would be at their disposal.

SOUTHERN RAILWAY POSTERS.—Inspired, no doubt, by the ease and comfort of Channel crossings by the new train ferry, the Southern Railway has issued a poster designed to allay the apprehension sometimes felt before the Dover-Calais voyage. A silhouette of the London area is superimposed upon a map of the Channel and adjacent coasts, in order to show that the trip between the two ports amounts to no more than a drive across London from Hendon to Croydon. Another poster which we have received emphasises the frequency and speed of the Southern Railway electric services. The words "don't worry, you'll be in plenty of time" appear alongside a figure anxiously consulting his watch, and at the foot of the poster is the familiar "Southern Electric" device.

British Railway Stockholders' Union Luncheon

Sir Robert Horne, Chairman of the Great Western Railway, was the principal guest of the British Railways Stockholders' Union Limited at the union's annual luncheon at Gatti's Restaurant, Strand, W.C.2, on November 11, with Sir Charles Stuart-Williams, Chairman of the union, presiding. Among those present were:—

The Rt. Hon. Sir Arthur Griffith-Boscawen; Sir Joseph Burn, K.B.E.; The Rt. Hon. Sir Hugh O'Neill, Bart., M.P.; Mr. Leslie Boyce, M.P.; Mr. Frederick Smith, Mr. W. H. Gaunt, Mr. Cole Deacon; Lord Daryngton, D.L., J.P.; Lady Stuart-Williams; Mr. C. H. Barfoot, Mr. D. Ross-Johnson, Mrs. Ross-Johnson, Mr. Ashley Brown, Mrs. Ashley Brown, Brigadier B. L. Beddy, Mr. F. Douglas Fox, Col. F. Hilder, Capt. the Hon. Cecil Holland, Colonel Hutton Wilson, Colonel Kelly, C.M.G., D.S.O.; Brig.-Gen. H. R. Sandilands.

Sir Charles Stuart-Williams, after proposing the loyal toast, introduced Sir Robert Horne. Other guests whom they were gratified to welcome included Sir Arthur Griffith-Boscawen, Chairman of the Royal Commission on Transport; Sir Joseph Burn, General Manager of the Prudential Assurance Company, Mr. Frederick Smith, Transport Executive for Unilevers Limited; Mr. W. H. Gaunt, Transport Manager of J. Lyons & Co. Ltd.; and Mr. G. Cole Deacon, Secretary of the Railway Companies' Association. He concluded by expressing the concern of railway shareholders at the hiatus still discernible between figures of national recovery and those of railway receipts.

Sir Robert Horne said he was very happy to address the union because the boards of railway companies and the stockholders had mutual interests. It was true that differences of opinion arose from time to time between them, but he begged stockholders to remember that where the actions of the railway companies differed from what seemed the proper course to stockholders, it was never due to any difference in motive. There was information at the disposal of the directors of railway companies which could not always be disclosed.

There was a sphere in which shareholders could look after their own interests, and at the same time be of the greatest possible service. This was by supplementing the work of the companies themselves in placing the case for the railways before the public as widely as possible.

Some criticism had been made of the capital expenditure which the railways were now incurring. But a great institution like a railway could not stand still, and progress was more necessary than ever now that the companies were faced with competition from the roads. The assistance given by the Government for raising money at a cheap rate for railway development works was a scheme which would work out for the benefit of the country as a whole.

Many people did not understand the present railway rating position. The

railways had not, as was sometimes believed, received a bounty; their properties had been overvalued in the past, and they had only now received a judgment which placed the matter in the proper perspective. In 1929 the rateable value of railway property was reduced to a quarter of its former net value. But the railways did not benefit by that reduction. The three-quarters by which this reduction was measured was paid by the railways into the rebates fund, and out of that sum certain traffics got considerable advantage; export coal, for example, got 70 per cent. Coal sent to iron and steel works benefited similarly. Certain agricultural traffics were reduced by 20 per cent., and iron and steel by 10 per cent. Four million pounds a year were distributed over these industries in the form of rebates. The payments of the railways into the rebate fund was the mechanism by which the Government operated concessions to these depressed industries.

The railway organisations had been taken advantage of as the channels through which those concessions had been made. They had paid into the rebates fund more than they should

because they had been rated too highly. Something like £2 million more than should have been paid had been contributed annually, and the fund was not now in a position to repay the companies. The rebates fund was entitled to borrow for the purpose of compensating any overpayments which had been made, and he imagined that steps in that direction were now to be taken. Perhaps the Government would put its credit behind the fund in raising money for the purpose. The money could not all be paid back at once, and the railways would be agreeable to its being spread over a series of years.

At the present time the railways were deriving increased traffic from activity in building and rearmament, and he was convinced that the general improvement would continue. They were meeting at a moment when they were entitled to considerably more hope than they had had in the immediate past. The public was being made aware of the merits of the railway companies and the difficulties they had suffered.

Lord Daryngton moved, and Mr. Leslie Boyce, M.P., seconded a vote of thanks to Sir Robert Horne. Sir Hugh O'Neill moved a vote of thanks to Sir Charles Stuart-Williams.

Questions in Parliament

Valuation of Railways

Mr. Thorne on November 5 asked the Minister of Health if he was now in a position to state whether the Government intended to settle the financial adjustments in connection with the valuation of railway hereditaments and the various local authorities.

Sir K. Wood.—No. Any financial adjustments arising out of the valuation of railways—on which I am glad to say the parties have reached agreement—will be a matter for settlement between the companies and the local authorities affected.

Live Electric Rails

Wing-Commander James on November 11 asked the Minister of Transport whether, in view of the danger to human and animal life, he would take

steps to ensure that all live electric rails were adequately protected upon railway systems in open country.

Mr. Hore-Belisha.—I am advised that live electric lines are protected where persons and animals are allowed on the line.

Stoke-on-Trent Property

Mr. Ellis Smith asked the Minister of Transport if he would urge the London Midland & Scottish Railway Company to take urgently-needed steps to improve its property in Stoke-on-Trent and Longton and to improve the conditions under the railway bridges.

Mr. Hore-Belisha.—Certainly, sir, if the hon. member will give me authenticated information which would justify a plea.

The Victoria Cottage Hospital, Barnet

The extension of the Piccadilly Line of London Transport to Cockfosters has caused a rapid growth in the population of the district—now estimated at well over 50,000—and has consequently increased the demands upon the Victoria Cottage Hospital, Barnet. To meet these requirements considerable extension work has been found necessary, and while this is in progress the hospital has been closed.

It is to be opened in its enlarged and

modernised form early in the new year by H.R.H. the Princess Royal. The final cost is estimated to be in the region of £20,000, of which £12,000 has been obtained locally; among the larger donations was £12,000 from the late Sir William Peat, and £2,000 from the late Mr. J. E. Jarvis. The hospital, which was founded to commemorate the Jubilee of Queen Victoria in 1887, has as its Honorary Director of Appeals Mr. A. J. Brickwell, formerly Estate and Rating Surveyor, L.N.E.R.

Road Transport Wages

Railway companies' statement to Government committee

The committee appointed by the Ministers of Labour and Transport to consider the question of the regulation of wages and conditions of service in the road motor transport industry (goods) met at Montagu House, London, S.W.1, on Tuesday last, November 10, under the chairmanship of Sir James Baillie, O.B.E., J.P., LL.D. A memorandum of evidence had been submitted in advance on behalf of the G.W.R., L.M.S.R., L.N.E.R., and Southern Railway, as being directly concerned in the subject of the inquiry by reason of their extensive activities in the transport of goods and parcels by road.

The memorandum opened with a reference to the fact that almost from the inception of railways the railway companies have undertaken the transport of goods by road by way of cartage and delivery to and from railway stations and their direct participation in the road industry may thus be said to have existed for fully a hundred years. In 1928 wider Parliamentary powers were obtained to enable the railway companies to provide road transport services generally, and since that date the railway companies have undertaken the transport of goods by road over wider areas and for longer distances, an extension of activity associated with the gradual transference from horse cartage to conveyance by motor, a process which is still continuing and is likely to continue.

Numbers of Staff, Vehicles, and Licences

At the last annual census (March, 1936) the four main-line railway companies employed 9,727 horse drivers and 8,038 motor drivers—practically all of whom are members of the permanent staff of the companies. The companies own and operate approximately 26,000 horse drawn vehicles, 9,000 motor vehicles, including tractors, and 5,000 trailer vehicles. The number of road licences held by the railway companies was given as 12,982 "A" licences and 74 "C" licences. In addition, the four main-line railway companies are financially interested in a number of goods road transport undertakings carrying goods and parcels traffic, certain of which they control, and in the other instances hold a part interest. The road transport undertakings controlled by the railway companies employ 997 horse drivers and 2,403 motor drivers, and own and operate 1,717 horse-drawn vehicles, 2,641 motor vehicles, and 601 trailers. Here also transference from horse cartage to motor transport is continuing.

It was thus claimed that the road transport departments of the railway companies, with their associated companies, are the largest of the road trans-

port undertakings in the country and constitute an important section of the road transport industry.

Arrangements as to Staff

The memorandum went on to record the staff arrangements. The staff employed by the railway companies on the transport of goods and parcels by road have from the first been treated as regards organisation and as regards remuneration and conditions of service as an integral part of the railway staff. Like the staff of the railway proper they came within the scope of the system of conciliation boards set up in 1907 within the purview of the Royal Commission of 1911 on railway staff, and were included in the scope of the amended conciliation machinery established in 1912 pursuant to the recommendations of the Royal Commission—a machinery which continued to function until the end of the war. In 1919 and 1920, when the railways were still under Government control a series of national agreements was entered into between the Railway Executive Committee of the Board of Trade and the three railway trade unions, and all relevant sections of those agreements were applicable to the staff employed by the railways in the transport of goods and parcels by road.

On April 9, 1929, an agreement was concluded with effect from April 15, 1929, between the railway companies and the National Union of Railwaymen concerning the conditions of service to be applied to road motor staff not performing ordinary goods or parcels collection or delivery services within the recognised goods or passenger station cartage areas.

The rates of pay applicable to railway road cartage staff are in agreed relation to those of other grades with which this staff come in contact, and from or to which they would be promoted. The conditions of service are closely interwoven with those of such grades, and indeed in the main are identical and they are covered by the comprehensive machinery of negotiation, agreed in February, 1935 in place of that established by the Railways Act, 1921.

The companies have been very successful in avoiding resort to casual labour and practically the whole of the drivers of horse drawn vehicles and the drivers of motor vehicles (apart only from staff specially engaged for seasonal traffic or for emergencies) are members of the permanent staff, while temporary or casual employees are dealt with on the same basis of pay and conditions as the permanent staff.

Redundancy and Promotion

In the event of redundancy arising, there is a definite and established system by which, in order to avoid discharges, individuals whose services are

no longer required in their existing positions are either moved to corresponding positions in other places or are moved back down the promotion ladder up which they have in all probability previously advanced. These redundancy arrangements are operated with the consent and goodwill of the elected representatives of the staff and of the trade unions, and in many cases, are the subject of specific agreement.

The effect is that, even where serious redundancy arises, discharges are minimised, and in any event only take place in the lowest grades and then in definite juniority order. These arrangements for dealing with redundancy involve interchange between the staff engaged on road work and those employed in connection with the operation of the railway. For example, a redundant motor driver might be reduced to the grade of horse carter, or checker in the goods shed. Similarly interchange between railway cartage staff and railway staff proper takes place frequently in connection with promotion, motor drivers being ordinarily recruited from staff already in the service in another grade, and eligible for promotion to cartage foreman, and so forth.

The railways claim that no industry possesses a machinery of negotiation more comprehensive or more effective than that which covers every individual member of the railway companies' staff engaged in the transport of goods and parcels by road.

Subsidiary Undertakings

As regards the subsidiary road transport undertakings controlled by the railway companies, these do not come within the purview of the railway machinery of negotiation, but within that of the National Conciliation Machinery of the Road Motor Transport Industry (Goods), and their agreements as to remuneration and conditions of service have in the main been entered into through that machinery or direct with the Transport and General Workers' Union or other appropriate unions.

Views of the Railway Companies

The views of the railway companies regarding the subject of the Inquiry by the Government Committee were stated as follow:—

"It is the considered view of the railway companies, both as directly concerned in the transport of goods by road by their own employees, and as indirectly concerned through their subsidiary road undertakings, that it is in the public interest and in the interest of the road transport industry that the remuneration of the employees and their conditions of service should be effectively controlled by some appropriate machinery of negotiation such as the National Joint Conciliation Board and its area boards, and, in the case of the railway companies, the agreed national machinery of negotiation.

"So far as the staffs directly employed by the railway companies are concerned, the railway agreements as to remuneration and conditions of service are applicable to

every individual and their proper application is fully safeguarded.

"So far as the staffs employed by road transport (goods) undertakings controlled by the railway companies are concerned, the agreements as to remuneration and conditions of service entered into with the Transport and General Workers' Union or other appropriate unions, or through the conciliation machinery of the road transport industry (goods) are fully applied.

"No doubt the same can be said in regard to many independent road transport undertakings, but it is common knowledge that many road transport operators who should properly come within the purview and under the authority of the National Joint Conciliation Board for the Road Motor Transport Industry (Goods), continue to apply rates of remuneration and conditions of service entirely at variance with the rates and conditions as determined by the board. The committee has already received a considerable amount of evidence on this point.

"This evidence is supported by the experience of the road undertakings controlled by the railway companies. They have from time to time acquired the control of other road undertakings and have found it necessary to increase rates of pay and improve conditions of service, in some instances very materially, of certain of the staff taken over, in order to bring them into line with the provisions of the National Joint Conciliation Board Agreement.

"The railway companies desire to direct special attention to the position of 'C' licence holders and to support the views of the National Joint Board and the employers who have given evidence before the committee as to the necessity for the control of the wages and conditions of service of staff employed by the holders of 'C' licences.

"As the committee will be aware, the 'C' licence holders control the majority of goods vehicles operating upon the road. In accordance with Section 6 (1) (b) of the Road and Rail Traffic Act, 1933, the licensing authority is compelled to grant any application for a 'C' licence unless the applicant is the holder of a licence which is suspended, or, unless a licence previously held by him has been revoked. The 'C' licence holders hitherto have been omitted from the provisions of Section 8 (2) of the Road and Rail Traffic Act, 1933, dealing with the wages and conditions of their employees, but in the view of the railway companies it is important that they should be subject to appropriate control in this respect.

"It is manifestly to the detriment of the railway companies, as road operators, and to the detriment of their subsidiary road undertakings, and indeed of all road transport undertakings which conform to remuneration and conditions of service properly determined that they should have to face the competition of undertakings which in no way conform to the remuneration and conditions determined by appropriate authorities."

Remarks of Sir James Milne and Mr. Kenelm Kerr

Sir James Milne, K.C.V.O., C.S.I., General Manager of the Great Western Railway Company, and Mr. Kenelm Kerr, O.B.E., Chairman, Railways Staff Conference, answered questions put by the committee.

The Chairman asked whether Sir James Milne would suggest that it would be in the interests of the community to have a national system of road transport corresponding to the railways, and the reply was made "It is a difficult question to answer." "Suppose," said the Chairman, "someone suggested 'Let us nationalise transport?'" and Sir James Milne replied "It would not be at all popular with the industry."

Answering further questions, Sir James thought that the National Joint Conciliation Board for the Road Transport Industry should be a voluntary body and have, for a period at any rate, means of enforcing its decisions. Sir James put forward a suggestion that all applications for licences should incorporate a declaration by the applicant that proper rates of pay and conditions of service would be observed, and the declaration should specify the agreement under which the operator proposed to work.

Mr. Kenelm Kerr, answering a question as to whether the railway companies consider road transport wages should be regulated on a local or on a national basis, expressed the view that in a scheme of wages and conditions to apply to the whole country they must have sub-divisions. He thought that, if such sub-divisions were allowed to grow up piecemeal, difficult problems would be certain to arise, but if, nationally, there was fixed the highest rate for London, and the lowest rate for rural areas, it would be possible to adjust rates for all places between these two extremes and so ensure some reasonable relationship.

Evidence given by the National Union of Railwaymen

Following the evidence given on behalf of the railway companies, Mr. John Marchbank, General Secretary of the National Union of Railwaymen, gave evidence. The union had submitted a memorandum dealing with its position in relation to road motor transport (goods) and the union's views as to the necessity for definite arrangements to bring wages and conditions on to a proper basis for all sections were stated in the following terms:—

Road transport (goods) work undertaken by railway companies is spread over the whole country. Accordingly, rail employees engaged in such work come into very close contact with men employed on similar work in the service of road transport concerns outside the railway management. It is during this contact that much information is obtained as to the wages and conditions under which such men are employed. Frequently, complaints reach the union from its members as to the low rate of wages, long hours of duty, and inadequate safeguards which operate in regard to road transport men.

"Enquiries have elicited the information that it is because of the non-recognition by the employers of a properly agreed and regulated basis of wages and conditions. Because of this much dissatisfaction is created in the minds of railway employees and it is not unknown

for a very definite indication being given that, where any contact with railways happens to be necessary, railway staffs resent association with the work performed under such conditions.

"Quite naturally it is in men's minds that the operation of bad conditions has a prospective serious effect upon those which they have been able to secure through their organisations.

"It is considered by the National Union of Railwaymen that in the interests of the public and the staffs concerned there is need for some definite arrangement which will ensure that there be a measure of standardisation throughout and that to achieve this some medium should be devised which would ensure the adherence of those concerned to the various conditions of employment considered to be appropriate to the class of work undertaken. It has been found in the railway operation of such methods that greater satisfaction is achieved, and the possibilities of industrial strife are considerably diminished. Men engaged on the work in question know their conditions and any breach thereof can be dealt with in a regularised manner."

Recommendations submitted by the Trade Unions represented on the National Joint Conciliation Board

On Monday, November 9, the committee examined a memorandum submitted by the trade unions represented on the National Joint Conciliation Board, namely, the Transport and General Workers' Union; the National Union of General and Municipal Workers; the Liverpool and District Carters and Motormen's Union; the United Road Transport Workers' Association. Recommendations submitted by the unions included the following:—

The unions, in the light of their experience in dealing with these problems, decided to ask that the Minister of Labour shall be given powers to enforce, for a period of at least five years, the decisions of the National Joint Conciliation Board for the Road Motor Transport Industry (Goods).

"The Unions also decided to ask that the obligation to observe fair wages and conditions not less than those laid down by the National Joint Conciliation Board shall be imposed upon the industry as a whole, including 'C' licence holders, and in determining what shall be considered 'not less favourable' the Minister shall have regard to the wages and conditions set out in the trade agreements under which the men are working."

THOS. FIRTH & JOHN BROWN LIMITED.—The directors announce their intention to pay off the outstanding £248,000 of 4 per cent. first mortgage debentures and £137,580 of 4½ per cent. mortgage debenture stock. It is proposed to issue in substitution £500,000 of 3½ per cent. debenture stock. Arrangements have been made whereby existing debenture stockholders would be given the right to convert into the new stock and the balance would be offered for subscription in cash by debenture holders and 6 per cent. preference shareholders.

RAILWAY AND OTHER MEETINGS

Central Uruguay Railway of Monte Video Limited

The annual general meeting of the Central Uruguay Railway of Monte Video Limited, was held at River Plate House, Finsbury Circus, London, E.C.2, on November 9, Mr. G. H. Harrison, C.M.G., M.Inst.C.E., Chairman of the company, presiding.

The Secretary (Mr. H. O. Tubby) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said it was difficult to give adequate expression to the sorrow which his colleagues and he felt at the recent sudden and untimely death of their Chairman, Sir Brodie Henderson. His tenure of office was brief, but it could truly be said that he had the interests of this group of companies at heart to a remarkable degree and had displayed ability in grasping the intricate problems involved. It was one of his set purposes in life to put these companies on a satisfactory footing once again, and although he had not lived to see that work accomplished, he (the Chairman) believed time would show that he had largely assisted in laying the foundation of a new structure.

The results for the past year were disappointing, for although most items of traffic had increased and currency receipts were higher by \$185,755, this became on conversion to sterling a decrease of £10,000. A debit balance of £177,000 had been brought forward from 1934-5, and, after charging the full debenture and other fixed interests, a final debit balance of £338,000 remained to be carried forward to the current year's account. The committee of shareholders had extended the moratorium to September 30, 1937.

The board was using the time afforded by the moratorium to study the re-organisation and reconstruction of the capital of the group of companies. The total nominal capital of the group, including debenture stocks, was some £12,000,000, but the market value, principally owing to the depreciation of the Uruguayan peso from a nominal value of 4s. 3d. to about 1s. 8d. a year ago, was less than £1,500,000. The present free exchange rate was approximately 2s. 2d., and the steady increase during the year gave hope for the future.

The railway had been faced with severe road competition, and had not been able adequately to raise many rates on goods and animals not affected by that competition, due to the industry not being able to bear them. Since July 4 last, however, a new system of rating had been introduced which reduced the higher tariffs to levels at which they could compete with the motor lorries, and increased the lower rates to a more economic level. The company was not yet earn-

ing a reasonable profit, and such surplus as was available had been used to reduce the company's overdraft with the bankers, which had been brought down from £535,000 on June 30, 1935, to £177,000.

It was essential that a mutual understanding should be arrived at with the extension lines, for at present the company was unable to meet its liabilities towards them under the working agreements. Details of the re-organisation and reconstruction scheme could not yet be imparted, but it was hoped to submit them to the consideration of shareholders in the new year.

The company had not benefited as much as had been hoped from the trade treaty with Uruguay, which allocated sterling for remission to London at the official rate, which at present was about 3s. 3d. to the dollar. Relations with

the Government had been cordial. Studies had been made by the Minister of Public Works with a view to devising some national plan for building access roads to the company's stations and to those on the State Railways with priority over other road construction. That was all to the good, but they hoped the Government would legislate for the co-ordination of road and rail transport generally, allocating to each its proper functions, the railways for bulk delivery and the roads for haul to and from the railways.

On the death of Sir Brodie Henderson, Mr. H. H. Grindley, O.B.E., had been elected to the board, while retaining the post of General Manager in Uruguay.

The report and accounts were unanimously adopted.

The Chairman then presided at the meetings of the Central Uruguay Northern Extension Railway Co. Ltd., and the Central Uruguay Eastern Extension Railway Co. Ltd., the reports and accounts of which were unanimously adopted.

Argentine Great Western Railway Co. Ltd.

The annual general meeting of the Argentine Great Western Railway Co. Ltd. was held at Winchester House, Old Broad Street, E.C.2, on November 10, the Rt. Hon. Viscount St. Davids, Chairman of the company, presiding.

The Secretary (Mr. J. T. Dillon) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said that his speech at the Buenos Ayres & Pacific meeting, of which shareholders had received a report, told them nearly all they needed to know. The most important feature of the past year was that the company had paid off the whole of the arrears for three and a half years on the second debenture stock, the holders of which had been paid 5 per cent. interest on those arrears. On December 1 the company proposed to pay a half year's interest on account of the 5 per cent. debenture stock. In the year under review, the Buenos Ayres & Pacific Railway had lost £985,000 upon exchange; but for that, the financial position of the whole system would be very different.

A slight improvement was shown in passenger traffic, which had been falling off for some years. A big improvement—over 11 per cent.—took place in goods traffic, which rose from 1,512,000 tons to 1,679,000 tons. Wine traffic, reaching nearly 600,000 tons, was the largest since 1930. The railway was now transporting wine in bulk, a service which producers found very convenient, and the use of tun wagons was likely to increase in future.

The next most important item of traffic was fresh fruit. At present, Great Britain took a great deal of fruit from South Africa, so that Argentine

produce had to fight against the preferential rates given to the Empire fruit. But for that he considered that no South African fruit would reach England. During the last three years despatches had been 31,000, 38,000, and 44,000 tons, and as to the export of fruit abroad, the United States last year took 6,300 tons, against 4,800; Brazil took 6,200 tons, against 5,500; Great Britain was the third biggest customer, taking 5,800 tons, against 2,800. Two-thirds of the fruit that came here was pears, and Great Britain was the Argentine's best customer in that respect.

There had been increases in most classes of vegetable traffic; potato traffic reached 47,000 tons, rising by 35 per cent. Onions amounted to 46,000 tons, an increase of 34 per cent. The area sown for vegetables was much greater than in the year before, because growers were certain of a ready market in Buenos Aires, a city with a population of two million. During the period under review, the company had had to use an increased number of refrigerator wagons for the transport of fruit and perishables.

Traffic originating from the principal canning factories in Mendoza was 13,000 tons. There was a great demand for canned vegetables and fruits in Buenos Aires. For the first time, shipments of tomato and grape extract had been made abroad, amounting to 715 tons of the former and 200 tons of the latter. From one of the cold storage warehouses in Mendoza there had been a record movement last year.

Capital expenditure had been greatly restricted; all expenditure of this kind was brought before the stockholders' committee. The general business of the country was improving, and if the

good prospects for the cereal harvest were fulfilled, traffics were likely to be maintained. Wine business was expected to be satisfactory, and the amount to be carried by the railway

should reach about 600,000 tons. The area under cultivation was still increasing. Some damage to fruit trees had been caused by frost last month. There was a new cement factory near

Mendoza, which, it was expected, would have a production of 120 to 150 tons a day.

The report and accounts were unanimously adopted.

Bengal Dooars Railway Co. Ltd.

The 46th ordinary general meeting of the Bengal Dooars Railway Co. Ltd. was held on Tuesday, November 10, at the offices of the company, Gresham House, Old Broad Street, E.C.2. In consequence of the recent death of the Chairman, Sir Henry P. Burt, the chair was taken by Sir Alexander K. Muir, Bart (Director).

The Secretary (Mr. F. J. Horne) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said it was with the deepest regret that he had to inform the meeting of the death of their highly esteemed Chairman, Sir Henry P. Burt who passed away on the thirty-first of last month after a short illness.

As they might be aware, Sir Henry was also Chairman of the Rohilkund & Kumaon Railway Co. Ltd., a director of the Bengal & North Western Railway Co. Ltd., of which company he had been Chairman for many years, and of the Bombay Baroda & Central India Railway Company. He had a distinguished career in India, and at one time was President of the Railway Board of India, and a Member of the Viceroy's Legislative Council. In recognition of his services he was created a Companion of the Order of the Indian Empire in 1909, Knight Commander of that Order in 1911, and Commander of the Order of the British Empire in 1918.

Sir Henry joined the board of the Bengal Dooars Railway Co. Ltd. in June, 1922, and was elected Chairman in December, 1930. His extensive experience in railway affairs and his sound judgment and advice had been of the greatest value to their company. He was a man of exceptional ability, and his reputation as an eminent railway authority was outstanding. His co-directors had hardly yet realised that he had passed away, but they desired to put on record their deepest sorrow at the loss of a valued friend and colleague, gifted with great business acumen, who gave unstintingly of his time and abilities to the work of their company, and who was always thoughtful, considerate and most courteous in his dealings with others.

With permission of the meeting, he proposed to take the directors' report and accounts for the year ended March 31, 1936, copies of which have been posted to each stockholder, as read. As a preliminary to his remarks he was pleased to say that, notwithstanding the rainfall during the monsoon having been considerably in excess of the normal, the company's protective works, supplemented by the new works,

the need for construction of which was forecast at their last meeting, had fully realised their expectations, and no damage to bridges or permanent way had been reported.

With regard to the report and accounts, capital expenditure during the year amounted to £8,953 as shown under various heads in statement No. 4. The year's working showed a decrease in coaching traffic receipts of Rs. 18,000 as compared with the previous year, being Rs. 3.71 lakhs against Rs. 3.89 lakhs, and a decrease in goods traffic receipts of Rs. 1,84,000 the total being Rs. 14.32 lakhs against Rs. 16.16 lakhs. The falling off in coaching receipts was due to road competition and the general slackness in trade.

The more serious reduction in goods traffic was due to various reasons. Receipts from all commodities carried, with the exception of wood which showed an increase of Rs. 14,000, and manures, an increase of Rs. 4,300, showed decreases, the principal of which were Coal, Rs. 86,700, due to less coal being carried and for shorter distances owing mainly to lorry competition; Food Grains, Rs. 30,000, due to smaller imports of rice and other grains; Jute, Rs. 22,800, partly due to restriction of the area placed under cultivation and partly to drought; Tea, Rs. 32,000, which was due in part to restriction of exports, the quota having been reduced from 87½ per cent. to 82½ per cent., and in part to the forwarding of tea on lorries to Maynaguri Road, from which station consignments were dispatched, instead of as heretofore from the various estates' normal stations, giving a longer lead. Small consignments of unclassified goods showed a reduction of Rs. 19,600, for which road competition was again largely responsible. Receipts from the ferry service, and miscellaneous earnings, were practically unchanged, being Rs. 50,100 against Rs. 51,000 for the previous year.

Working expenses showed a reduction of some Rs. 16,000 but in consequence of the decreased receipts the percentage to gross earnings increased by 5.48, viz., from 57.77 to 63.25. The question of the reduction of working expenses had received and was receiving most careful consideration, and although it was not possible to economise correspondingly with any considerable decrease in earnings, as the standard of the permanent way and rolling stock consistent with public safety had to be maintained, every effort was being made to reduce expenses to a safe minimum. It was necessary, however, to mention that additional expenditure on locomotive repairs and replacements, &c., which would fall upon both capital

and revenue, would become imperative in the near future.

After making allowance for the payment of Indian income tax and super tax the revenue account showed aggregate earnings of £45,544 18s. 4d., a decrease of £14,147 16s. 7d. compared with the previous year, which amount, with the balance brought into account from the year 1935, gave a total of £105,010 12s. 2d. The payment of the preference stock dividend for the year amounting to £14,400, of an interim dividend on the ordinary stock £12,000, and provision for British income tax £1,500, left a balance of £77,110 12s. 2d., of which £10,000 had been carried to reserve; so that there was now a balance of £67,110 12s. 2d. to be dealt with. From this the directors recommended the payment of a final dividend of 3 per cent. on the ordinary stock, making a total distribution for the year of 6 per cent., leaving a balance to be carried forward of £55,110 12s. 2d.

A considerable and adverse influence upon receipts had been created by motor lorry and bus competition. In particular the short circuiting action of a number of tea estates in forwarding consignments of their produce by motor vehicles to Maynaguri Road, a station at a considerable distance from their gardens, and by the same means carrying coal from that station to the gardens, caused the company some anxiety; but, after prolonged negotiations, they had come to an amicable, and what they hoped would prove to be a satisfactory agreement which had now, they were informed, been accepted by practically all the estates. Although this had necessitated a modification of freight rates and a corresponding reduction in revenues, it had relieved the company of the inevitably larger reduction which would have been the result of a continuation of the use by the estates of Maynaguri Road station. There had also to be taken into account the prospect of this method of transport becoming general; which was more than a possibility in view of the metalling and bridging of roads which was now in progress.

The agreement made assured that all the normal traffic from the large majority of the tea estates would be retained by the railway.

As the company's railway was constructed primarily to serve the tea industry in the Dooars, and as it could be claimed without fear of contradiction, he considered, that the growth and prosperity of the industry in that district had been accounted for in large measure by the progressive policy adopted by the company, it gave them peculiar satisfaction to record the conclusion of this agreement. While they,

on their side, could not but appreciate the desire of the tea producing companies to effect any saving in transport charges open to them, they were gratified that the latter, on their part, in offering to meet the company half way, had recognised the debt due to the railway for the development of the district. Before leaving the subject it might not be out of place, perhaps, to remind the present generation of the company's early lean years and of the many difficulties which had to be surmounted, often at great expense, before the railway was brought to its present state of efficiency, a condition which, perhaps naturally, they might be rather inclined to take too much for granted.

Small progress towards regulating the running of road vehicles had yet been made by the authorities in the districts served by the railway, beyond that the plying for hire of omnibuses and motor cabs was prohibited between Chalsa and Bagrakote "in view of the existence of alternative facilities for the conveyance of passengers." No opportunity had been missed for emphasising

the representations already made as to the need for prompt action in this respect.

Returns up to October 20 showed a decrease of Rs. 19,736 over the corresponding period of last year. In conclusion he wished again to express the company's appreciation of the efforts of Mr. Polwhele, his traffic, engineering and locomotive staffs. He had also to add that the thanks of the board were due to Mr. Horne and his staff here, in London, for their efficient conduct of the company's affairs. He then moved "That the report of the directors and the audited statement of accounts for the year ended March 31, 1936, now presented, be and they are hereby approved, confirmed and adopted."

The resolution was seconded by Mr. Langford James, and carried unanimously.

The Chairman next moved "That a final dividend of 3 per cent. on the ordinary stock of the company for the year ended March 31, 1936, subject to income tax, making, with the interim dividend of 3 per cent. paid on

March 26, 1936, a distribution of 6 per cent. for the year, be and it is hereby declared to be paid to the holders of ordinary stock standing on the registers of the company on October 28, 1936, and that warrants for the dividend be issued on November 11, 1936."

Mr. G. Anson Bayley seconded, and this motion was also carried unanimously, after which the Chairman moved the re-election of Mr. R. H. L. Langford James, the director, retiring by rotation.

Mr. J. A. Tassie seconded, and the motion was put to the meeting and carried unanimously.

Mr. F. J. Horne proposed the re-election of W. A. Browne & Company as auditors of the company for the ensuing year at a remuneration of 70 guineas, and, the motion, seconded by Mr. J. A. Tassie, was carried unanimously.

A hearty vote of thanks to the company's agents in Calcutta, and to the Manager and his staff in India, was proposed by the Chairman, seconded by Mr. G. Anson Bayley, and unanimously endorsed by the meeting.

Central Argentine Railway Limited

The ordinary general meeting of the Central Argentine Railway Limited was held at River Plate House, Finsbury Circus, London, E.C.2 on November 12. The Chairman, Mr. W. Howard-Williams, was unable to preside owing to the bereavement he had sustained in the death of his wife the previous night. Mr. W. K. Whigham, who took the chair in his place, said he was sure the meeting would wish the directors to send a message of sympathy to Mr. Howard-Williams and his family.

The London Manager and Secretary (Mr. Ronald Leslie) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, expressed the regret of the board at the death of Sir Brodie Henderson, who had been practically in daily touch with the railway for 45 years and was the possessor of valuable technical knowledge. There had been two important changes since the last meeting. Mr. Ronald Leslie had had 22 years' service with the company, and had been General Manager for 10 years. He had now been appointed London Manager and Secretary, a change that would enable their own and other Anglo-Argentine undertakings to derive the fullest advantage from Mr. Leslie's intimate knowledge of Argentina and his long association with the Argentine authorities.

Mr. Leslie had been succeeded as General Manager in the Argentine by Mr. D. M. MacRae. Mr. MacRae was not by any means a newcomer to the Central Argentine Railway, as he went to Argentina in 1912 to take up the

position of Assistant Traffic Manager, and, after adding to his knowledge of railway affairs, first as General Manager of the United Railways of Havana and, latterly, as General Manager of the Cordoba Central Railway, he had accepted the invitation of the board to place his considerably wider experience at its disposal.

The gross receipts showed a decrease of £250,000. As the result of drought, the earnings from wheat and linseed traffic decreased by £588,000, those for wheat being the lowest for 18 years. Maize, however, turned out well and the increased earnings under that heading went a long way towards recouping losses in connection with wheat and linseed. The railway would have done much better had not the shipment of the maize crop been held up by excessively wet weather during the closing months of the financial year.

Working expenses were up by £48,000 in spite of the fall in receipts. There were three main causes for this. The first was that full salaries and wages, accounting for an addition of £66,000, were paid to the staff of all grades throughout the year, whereas in the previous year wage and salary cuts had been in force for three months. The second item was an exceptional allocation of £100,000 to meet impending replacement of power house plant. And the third an additional contribution of £37,000 to the accident and contingencies fund. As against this total additional outlay of £203,000 might be set a reduction of £139,000 in the sum provided for renewals. When business on the railway began to grow once more, they must be prepared to face more liberal programmes of

renewal works. That did not mean that the company was faced with considerable arrears of renewals although the renewals fund was smaller. The railway was in good condition. During the past eight years over £4,000,000 sterling had been spent on re-laying permanent way and replacing rolling stock, while means had been found both of reducing maintenance costs and of appreciably prolonging the life of the line and of equipment.

There had been large increases in traffic returns up to date for the present financial year as compared with last. For the 19 weeks that had elapsed since the beginning of the new financial year, these increases in the aggregate now stood at £370,127 at the average rate of exchange. In view of all the circumstances, the directors felt themselves justified in recommending a dividend at the rate of 3½ per cent. on the 4½ per cent. preference stock, this being the first time that a dividend had been declared on that stock since 1933, and represented an amount about equivalent to the aggregate amount of the balance of the net revenue accounts since that year. After allowing for this dividend payment, the carry forward remained at a figure slightly in excess of that at June 30, 1933.

The dividend might be regarded as a good omen. It was a sign of improvement, not only in the company's own affairs, but in the affairs of Argentina herself. Today the corner appeared to have been turned, and due credit should be given to those responsible for the control of the country's government and finance.

The difficulties of the railways during the past few years had been of two kinds—uncontrollable and controllable. The uncontrollable arose from depression and adverse harvests.

As to the controllable, he would refer first to the coming revision of the General Railway Regulations based upon the Railway Law of 1891. Coming to the general question of competition, road competition was actually developing more slowly than it did for example in Great Britain, because heavy expenditure was required to make the Argentine roads proof against unfavourable weather conditions and suitable at all seasons for heavy motor traffic. Healthy competition between road and rail transport was, of course, desirable, and they were prepared to meet all such reasonable competition, provided that equality of conditions was maintained.

It was often alleged that the railways had made such enormous gains in the past that the question of any return on their capital need no longer be considered. That suggestion was entirely baseless. A recent study by an eminent Argentine economist showed that the average return on all railway capital in the Argentine since 1908 had been 3.77 per cent., a most modest return when it was recollected that the interest on debenture stocks and loans was included in this figure. Another persistent allegation was that the rates on the Argentine Railways were exorbitant. So far from this being the case, on the same authority the goods rates on the Argentine lines were, on the average, actually lower than those in force in most other countries and, as regards passenger fares, the charges were lower in Argentina than in practically any other country.

Finally, there was the oft-repeated charge of inadequate passenger accommodation. The best refutation of this charge had come recently from the present Argentine Minister of Public Works, Dr. Alvarado, who, after a recent visit to Europe, expressed the view that accommodation on the Argentine railways bore advantageous comparison in many respects with those of the old world.

The maintenance of the level of efficiency of the railways under changing economic conditions was a problem which was giving concern to other nations besides Argentina at the present time, and the recent Government guaranteed loans in Great Britain were instances of one way of meeting it. Few countries were still so dependent on railway transport as Argentina. The great volume of traffic was in bulk and one could not think at the present time of any really adequate substitute for railway transport, for example, in the case of the millions of tons of cereal traffic which the economy of the country required to be transported in the most efficient and economical manner. These were sound arguments for a fair and reasonable solution of the transport problem.

He had hoped to be in a position to say something with regard to the negotiations for the renewal of the Roca-Runciman agreement, but, as they would have seen, these negotia-

tions had now been prorogued for a fortnight. Under these conditions they would agree that it was not desirable that he should make any comment.

A cable from the General Manager said that there was every indication that the improved traffic receipts recorded since July 1 this year would continue as there were now some 2,200,000 tons of grain on hand at

stations and farms, for which there was good demand, against 2,000,000 tons last year, with weak demand. Other cereals were in excellent condition, and passenger traffic, both main line and suburban, showed improved results since July 1, and, in general, the outlook was satisfactory.

The report and accounts were unanimously adopted.

RAILWAY AND OTHER REPORTS

Midland Uruguayan Railway.—Gross receipts for the year ended June 30 last amounted to \$877,126 (against \$844,391 for 1934-35), and working expenses to \$802,977 (against \$766,557), leaving net receipts at \$74,149 (against \$77,834). Net receipts, in sterling, amounted to £7,489, against £13,643. After crediting miscellaneous income and charging 5 per cent. prior lien debenture service, income-tax, &c., the net outcome of the year's operations (without making any provision for renewals reserve) is a loss of £387, which increases the debit balance carried forward to £52,798. The operating ratio, in sterling, was 91.34 per cent., compared with 87.80 per cent. in 1934-35.

Uruguay Northern Railway.—For the year ended June 30, 1936, gross receipts amounted to \$100,933 (against \$92,361 in 1934-35) and net receipts to \$3,041 (against a loss of \$9,260). After charging interest on the 5 per cent. prior lien debenture stock, &c., there was a net loss for the year in sterling of £1,283, before making any provision for renewals reserve. This increases the debit balance carried forward to £13,116. The operating ratio, in sterling, was 96.29 per cent. compared with 108.72 per cent. in 1934-35. Receipts from almost every class of traffic showed an increase. The committee of stockholders appointed under the moratorium scheme affecting the payment of interest on the 5 per cent. prior lien debenture stock have extended the moratorium period for a further year to July 31, 1937.

Manila Railway Co. (1906) Ltd.—The latest accounts of this company, which holds securities in the Manila Railroad Company of the Philippine Islands, cover an abnormal period for the company, owing to the sale in February last of its holding of \$8,170,000 of 4 per cent. Southern Lines bonds of the operating company. Income from the Philippine company in the year ended June 30 was £193,838, against £245,582 for 1934-35, but a credit of £19,000 arises in respect of income-tax reserve no longer required. After meeting debenture interest and the "B" debenture sinking fund allocation, the net balance for the year is £27,663, against £44,617. It is proposed to apply £27,442 in the payment of a dividend of 3 per cent. (unchanged) on the preference capital. The directors also propose to pay an additional dividend of 1 per cent. for the year

1934-35 on the preference capital out of that part of the balance of £16,059 brought forward attributable to 1934-35. After placing £5,000 to reserve for administration expenses, there will be a balance of £2,132 to be carried forward.

British Electric Traction Co. Ltd.

—An interim dividend is announced of 2½ per cent. on the deferred ordinary stock (the same), payable December 15.

John I. Thornycroft & Co. Ltd.

A profit of £53,740 for the year ended July 31 is announced. After meeting debenture interest this is sufficient to wipe out the debit on profit and loss account and to carry forward a credit of £6,777.

Foreign Railways Investment Trust.

—The report for the year ended October 31, 1936, shows that revenue amounted to £8,167, against £8,423, plus £45,080 brought in. After providing for all expenses there remains a balance of £44,897, which the directors recommend should be carried forward. Investments stand in the balance sheet at £3,198,082, against £3,278,428, but a valuation as at October 31 shows a heavy depreciation on book value.

British Oxygen Co. Ltd.

—An interim dividend is announced on the ordinary stock of 7 per cent., or 1s. 4.8d. per £1 unit, on account of the year 1936. Warrants will be posted on November 17. The directors state that the results for the year to date would justify them in increasing the interim distribution, but they have decided to hold over the question of increased distribution or capital bonus until the final results for the year are available.

Tecalemit Limited.

—The report for the year to July 31 last shows a profit of £70,783 after charging manufacturing and administrative expenses and providing for bad and doubtful debts. This compares with a profit of £53,687 in the initial period October 16, 1934, to July 31, 1935. After providing for depreciation, writing off of patents, licences, and designs, and preliminary expenses, and other items, placing £10,000 to general reserve, and adding £2,987 brought in, there is a total of £31,492 available. The dividend proposed is 12 per cent., less tax, leaving £4,614 to be carried forward. A preliminary scheme for further factory extensions is being prepared.

NOTES AND NEWS

Improvements at Newmarket Station.—In order to provide better facilities for loading and unloading race horses at the old station at Newmarket, certain improvements are to be effected by the L.N.E.R. The two platforms which accommodate a total of 55 horse boxes are to be raised to a uniform height of 3 ft. 6 in. and suitably re-surfaced, whilst the platform awning, which is supported by pillars which cause an obstruction, is to be removed.

Railway Sought at Lynton.—Since the closing on September 29, 1935, of the narrow-gauge Lynton & Barnstaple Railway, inhabitants of Lynton and Lynmouth, in North Devon, have been further from a railway station than those of any other place in England. Now it is reported that they are petitioning the Southern Railway to build a new railway from Morthoe to Lynton. Presumably the suggestion envisages a standard-gauge branch along the top of the hills.

Central Railway of Chubut.—Notice is given that the Central Railway of Chubut Co. Ltd. will pay off the whole of its outstanding 6 per cent. debentures (amounting to £95,800) on May 13, 1937, with interest from January 1, 1937, up to that date. The coupon for the interest due on January 1, 1937, will be paid in the usual way. The railway has been purchased by the Argentine Government, payment of the purchase price being made in Argentine 4 per cent. sterling bonds, 1933.

Road Vehicles in Great Britain.—The Minister of Transport has issued a return giving particulars of the number of motor vehicles registered for the first time under the Roads Act, 1920, during the month of September, 1936. The number of new motor vehicles registered was 32,835, compared with 28,128 in September, 1935, the figures for the several classes being:—

	September, 1936	September, 1935
Cars taxed on horse-power ...	21,557	19,031
Cycles ...	3,082	2,613
Hackney vehicles ...	453	386
Goods vehicles ...	6,297	4,963
Other vehicles ...	1,446	1,135
	32,835	28,128

Cordoba Central Railway.—Lord Farrer, presiding on November 11 at the ordinary general meeting of the Cordoba Central Railway, said that the set back of £6,711, or 2½ per cent. in the net working receipts was not due to any increase in expenses, for these were actually £129 less, but to a fall in gross receipts, principally owing to poor wheat, maize, and linseed harvests. Since 1930 there had been a progressive reduction year by year in expenses from £2,570,000 to £1,936,000. The stage had, however, now been reached at which expenses could not be further reduced without impairing the efficiency

and earning power of the railway, and an increase in working costs must be expected in the future.

Chosen State Railways Results.—For the fiscal year 1934-35 the Chosen State Railways operated an average route mileage of 1,863, and over 650 miles of new line were under construction. The total revenue for the year was 83,932,333 yen (an increase of no less than 26 per cent.) and the expenditure 62,319,863 yen (an increase of the same proportion). The number of passengers carried was 25,614,815 (+ 14 per cent.) and the goods tonnage 7,681,776 tonnes (+ 6 per cent.).

Railway Appeal in Bouts-Tillotson Case.—The four main-line railway companies have now entered an appeal against the decision of the Metropolitan Licensing Authority in the recent application by Bouts-Tillotson Transport Limited, for the renewal of licences. We stated on page 647 of our issue of October 23 that an appeal was to be lodged. An application made to the appeal tribunal to fix an early date for the hearing of the appeal resulted in December 7 and following days being fixed.

Cammell Laird New Capital.—At an extra-ordinary meeting of Cammell Laird & Co. Ltd., held at Birkenhead on November 11, a resolution was carried unanimously sanctioning the issue by the directors of unissued ordinary shares of 5s. each to a total number not exceeding 800 shares. Mr. W. L. Hichens, the Chairman, explained that the fresh capital was required to meet the expanding needs of the company. It was proposed to offer these new shares to existing shareholders at par, and seeing that today the 5s. units of stock were quoted at 19s., he hoped the offer would be regarded as acceptable.

New Road Competition in Ireland.—Mr. J. T. O'Farrell (Irish Secretary, Railway Clerks Association), speaking recently at a meeting of the Cork branch said that the Road Transport Act of 1933 was being abused in a manner never contemplated by the Oireachtas. Some operators of road transport, who had their services acquired by the railway companies at a very generous price, reappeared shortly afterwards on the roads as wholesalers. The latter being exempt from the terms of the Act, this development meant that they used the money received from the railway companies to purchase fleets of new lorries and start road competition all over again.

Manifold Valley Light Railway to Become Public Footpath.—The Staffordshire County Council has accepted the offer of the L.M.S.R. to hand over the site of the disused Manifold Valley Light Railway throughout the whole of its course of approximately

8 miles between Waterhouses and Hulme End, including the superstructures of the 22 bridges across the waterways. The offer is recognised as a handsome one, and it is the intention of the council, in accordance with the donor's object, to preserve the track exclusively as a public footpath. The railway company will remove the railway material and adapt the track for its new purpose at its own expense.

More Continuous Welded Rails in U.S.A.—4,000 ft. lengths of rail have recently been laid through two tunnels on the Northern Pacific Railway. They were welded on flat cars which were run into the tunnels, the trains parted in the middle, and each section drawn out to the opposite ends. The rails which were mounted on rollers dropped on to the track as the wagons were withdrawn from under them. The tunnels concerned were the Blossburg tunnel in the Rockies just west of Helena, Montana, and the Bozeman tunnel between Livingston and Bozeman, Montana.

Japanese Local Railways.—During the fiscal year 1935 the private railway systems, all local, in Japan were 260 in number and had an aggregate mileage of 4,400 miles, of which 4,390 miles were being worked. These lines were operated by 730 steam engines, 164 electric, and 3 petrol locomotives; the carriage stock of 4,343 included several railcars, and the wagon stock totalled 11,006 vehicles. The capital invested in all these lines amounted to 1,233,342,593 yen; the operating revenue was 91,606,427 yen and the working expenditure 51,857,275 yen, giving an operating ratio for the lines as a whole of 56.6.

London Transport Players.—This week the London Transport Players are presenting at the Scala Theatre, London, the famous musical play "Chu Chin Chow." The performances began on Tuesday night and are continuing to the end of the week. This year the London Transport Musical and Dramatic Society has as its producer Mr. Cyril Corker, who in previous productions of the society has proved a popular comedian. The musical director is Mr. Frederick Doughty. This is the twenty-eighth production of the society, which, of course, was formerly the T.O.T. Philharmonic Society, and since 1921 has given many notable performances.

New G.W.R. Government-Guaranteed Loan Works.—Arrangements are being made to carry out a number of these works, including the following: at Criccieth the station buildings are to be extended and the platforms raised to standard height; at Ashton Gate two platforms are to be extended southwards to 465 ft. in length, and the down booking office and waiting room are to be replaced by larger ones at the back of the down platform extension; at Horfield the station building is to be enlarged; at Truro

the down platform verandah is to be extended; at Kidderminster the goods yard sidings are to be remodelled and new goods loops provided south of the station; at Aberystwyth the engine shed is to be rebuilt and extended to 210 ft. in length, and new workshops and boiler house are to be provided; at Glyn Neath the engine shed is to be enlarged to three times its present size and an additional siding and coal stage provided; at Lydney two additional loops are to be laid east of the station; and at St. Agnes a 300-ft. island platform is to replace the existing platform, so as to enable this station to be made a crossing place.

Newcastle Central Station.—The L.N.E.R. is about to rearrange certain of the existing ticket collection barriers at the Central station, Newcastle. The barriers in question are those in the circulating area on the town side of the station which serve the main "north" departure platform No. 8, and the overbridge leading to the "south" departure platforms Nos. 9 and 10. The scheme

involves the removal of the two existing barriers, and the provision of the new barrier so arranged as to enclose the approach to the overbridge. A new ticket collectors' office will be provided together with an improved type of train arrival indicator. The alterations will facilitate the ticket collection arrangements and tend to relieve the congestion now experienced at the entrance to the platforms.

Road Accidents.—The Ministry of Transport return for the week ended November 7 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year:—

	Killed, including deaths resulting from previous accidents		Injured	
England	127	(117)	4,020	(3,830)
Wales	8	(6)	179	(139)
Scotland	16	(10)	393	(352)
	151 (133)		4,592 (4,321)	

The total fatalities for the previous week were 154, compared with 156 for the corresponding period of last year.

British and Irish Railways Stocks and Shares

Stocks	Highest 1935	Lowest 1935	Prices	
			Nov. 11, 1936	Rise/ Fall
G.W.R.				
Cons. Ord. ...	55½	44½	60	+14
5% Con. Prefce ...	124	108	125	—
5% Red. Pref. (1950) ...	117	106½	110½	—
4% Deb. ...	118½	108	115½	—½
4½% Deb. ...	122	110	119½	—
4½% Deb. ...	129½	118	127½	—
5% Deb. ...	140½	130	138½	—
2½% Deb. ...	82½	68½	76½	—
5% Rt. Charge ...	137	128	135½	—
5% Cons. Guar. ...	136¾	120½	133½	—
L.M.S.R.				
Ord. ...	25½	16	32½	+½
4% Prefce. (1923) ...	58½	43½	80	+½
4% Prefce. ...	87½	73½	91	+½
5% Red. Pref. (1955) ...	107	97½	108½	—
4% Deb. ...	110½	99½	110½	—
5% Red. Deb. (1952) ...	119½	111½	116½	+1
4% Guar. ...	105½	95½	105½	—
L.N.E.R.				
5% Pref. Ord. ...	157½	81½	121½	—½
Def. Ord. ...	79½	45½	61½	—½
4% First Prefce. ...	74½	48	78½	+½
4% Second Prefce. ...	31½	16½	30½	+½
5% Red. Pref. (1955) ...	92½	71	99	—
4% First Guar. ...	103½	93	102	—
4% Second Guar. ...	98½	82½	98	—
3% Deb. ...	86	75	84	—
4% Deb. ...	109½	98½	108½	—
5% Red. Deb. (1947) ...	118½	106½	112½	—
4½% Sinking Fund Red. Deb.	112½	108	110½	—
SOUTHERN				
Pref. Ord. ...	87½	69½	97½	+½
Def. Ord. ...	25½	16½	26½	+½
5% Prefce. ...	124	108½	125	—
5% Red. Pref. (1964) ...	117½	109½	117½	—
5% Guar. Prefce. ...	136½	121½	133½	—
5% Red. Guar. Pref. (1957) ...	121½	112½	117½	—
4% Deb. ...	116½	107	113½	—1
5% Deb. ...	138	130½	137½	—
4% Red. Deb. ...	115	106½	112½	—
1962-67				
BELFAST & C.D.				
Ord. ...	9	4	4½	—
FORTH BRIDGE				
4% Deb. ...	111½	104½	105½	—
4% Guar. ...	109½	104	105½	—
G. NORTHERN (IRELAND)				
Ord. ...	20	7	11½	—¾
G. SOUTHERN (IRELAND)				
Ord. ...	57½	14½	55	+1
Prefce. ...	50	25½	60	—½
Guar. ...	88½	51½	90	—
Deb. ...	86½	70	99	+2
L.P.T.B.				
4½% "A" ...	130	119½	126½	—
5% "A" ...	139½	130	136½	—
4½% "T.F.A." ...	113½	108	111	—
5% "B" ...	131½	122½	129½	—
"C" ...	109½	91	97	—1
MERSEY				
Ord. ...	23½	9½	37	—
4% Perp. Deb. ...	100½	93½	100	—
3% Perp. Deb. ...	75½	67	76½	—
3% Perp. Prefce. ...	62	47½	67½	—

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 45th Week			Totals to Date		
	1936	1935	Inc. or Dec.	1936	1935	Inc. or Dec.
L.M.S.R. (6,916½ mls.)						
Passenger-train traffic...	406,000	388,000	+ 18,000	22,641,000	22,083,000	+ 558,000
Merchandise, &c.	521,000	493,000	+ 28,000	21,499,000	20,296,000	+ 1,203,000
Coal and coke	262,000	271,000	— 9,000	10,726,000	10,312,000	+ 414,000
Goods-train traffic	783,000	764,000	+ 19,000	32,225,000	30,608,000	+ 1,617,000
Total receipts	1,189,000	1,152,000	+ 37,000	54,866,000	52,691,000	+ 2,175,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	277,000	265,000	+ 12,000	14,718,000	14,406,000	+ 312,000
Merchandise, &c.	353,000	349,000	+ 4,000	14,614,000	14,116,000	+ 498,000
Coal and coke	243,000	258,000	— 15,000	10,409,000	9,971,000	+ 438,000
Goods-train traffic	596,000	607,000	— 11,000	25,023,000	24,087,000	+ 936,000
Total receipts	873,000	872,000	+ 1,000	39,741,000	38,493,000	+ 1,248,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	174,000	163,000	+ 11,000	9,548,000	9,370,000	+ 178,000
Merchandise, &c.	208,000	196,000	+ 12,000	8,588,000	8,236,000	+ 352,000
Coal and coke	108,000	121,000	— 13,000	4,499,000	4,444,000	+ 55,000
Goods-train traffic	316,000	317,000	— 1,000	13,087,000	12,680,000	+ 407,000
Total receipts	490,000	480,000	+ 10,000	22,635,000	22,050,000	+ 585,000
S.R. (2,153 mls.)						
Passenger-train traffic...	261,000	253,000	+ 8,000	13,990,000	13,724,000	+ 266,000
Merchandise, &c.	59,000	58,000	+ 1,000	2,831,000	2,784,000	+ 47,000
Coal and coke	26,000	31,000	— 5,000	1,379,000	1,332,000	+ 47,000
Goods-train traffic	85,000	89,000	— 4,000	4,210,000	4,116,000	+ 94,000
Total receipts	346,000	342,000	+ 4,000	18,200,000	17,840,000	+ 360,000
Liverpool Overhead (6½ mls.)						
Mersey (4½ mls.)	1,170	1,109	+ 61	53,840	53,253	+ 587
*London Passenger Transport Board	4,279	4,118	+ 161	182,958	180,408	+ 2,550
	574,400	560,400	+ 14,000	10,649,400	10,338,700	+ 310,700
IRELAND.						
Belfast & C.D. pass. (80 mls.)	1,798	1,965	— 167	117,392	116,164	+ 1,228
" " goods	506	647	— 141	24,107	22,908	+ 1,199
" " total	2,304	2,612	— 308	141,499	139,072	+ 2,427
†Great Northern pass. (543 mls.)	10,050	8,650	+ 1,400	489,250	468,650	+ 20,600
" " goods	8,700	9,300	— 600	424,350	422,150	+ 2,200
" " total	18,750	17,950	+ 800	913,600	890,800	+ 22,800
†Great Southern pass. (2,067 mls.)	31,116	27,241	+ 3,875	1,622,999	1,570,754	+ 52,245
" " goods	58,817	57,871	+ 946	1,861,942	1,745,581	+ 116,361
" " total	89,933	85,112	+ 4,821	3,484,941	3,316,335	+ 168,606

* 19th week.

† 44th week.

CONTRACTS AND TENDERS

Hurst Nelson & Co. Ltd. has received an order from the War Office for 25 standard-gauge four-wheeled low-sided shot wagons.

The Bombay, Baroda & Central India Railway Administration has placed the following orders for material required for the assembly in India of nine YF class metre-gauge 0-6-2 tender locomotives, for branch line service:—

Howell & Co. Ltd., 117 superheater flue tubes and 648 steel boiler tubes.

Coltress Iron Co. Ltd., 54 cast steel wheel centres.

John Spencer & Sons (1928) Ltd., 63 axles. English Steel Corporation Limited, 144 tyres. Vereinigte Deutsche Metallwerke A.G., 25 copper firebox plates.

Vacuum Brake Co. Ltd., vacuum brake fittings.

Superheater Co. Ltd., nine sets of superheater elements.

A.B.C. Coupler & Engineering Co. Ltd., 18 couplers.

S. A. Friens Jourdain Monneret, Lamberts' wet sanding gear.

J. Stone & Co. Ltd., electric lighting equipment.

Caprotti Valve Gear Limited, Caprotti valve gear.

The above equipment is to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The Bombay, Baroda & Central India Railway Administration has also placed the following orders for machine tools and equipment to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton:—

F. E. Rowland & Co. Ltd., one floor grinding machine.

Alfred Herbert Limited, one bolt screwing machine.

Follows & Bate Limited, two combined paint mixing and grinding machines.

Noble & Lund Limited, one 60-ft. metal band sawing machine.

Ormerod Shapers Limited, one tool room shaping machine, 12-in. stroke.

James Archdale & Co. Ltd., one 3-ft. radius radial drilling machine.

Porm & Co. Ltd. has received an order through Shalebhoj Tyebjee & Sons from the Bombay, Baroda & Central India Railway for 2,100 yards of green leather cloth.

Stewarts and Lloyds Limited has received an order from the Buenos Ayres Great Southern Railway for 4,400 solid drawn steel boiler tubes.

British rail makers have received orders to the inspection of Messrs. Sandberg for 9,000 tons of flat-bottomed rails of 43 kilos per metre section for the Shanghai-Hangchow-Ningpo and Nanking-Shanghai Railways.

Norris, Henty & Gardners Limited has received an order from the United Railways of the Havana & Regla Warehouses Limited for two 68-b.h.p. and one 85-b.h.p. hand starting high-speed oil engines together with a quantity of spares.

Robert Stephenson & Co. Ltd. has received an order from the Cordoba Central Railway for four locomotive boilers.

W. G. Bagnall Limited has received an order from the Assam Railways &

Trading Co. Ltd. for two boilers for "H" class 4-6-0 locomotives.

Japanese Rails for Brazil

The sale of two and a quarter million yens' worth of rails to the State of Bahia, Brazil, has been arranged by an export syndicate formed by the Mitsui, Mitsubishi, Osaka Shosen Kaisha companies and three other concerns, states Reuters. The rails will be supplied by Mitsui and Mitsubishi. The new syndicate is known as the Japan-Brazil Industrial Council.

Imperial Chemical Industries (Rexine) Limited has received an order through Imperial Chemical Industries (India) Limited from the Bombay, Baroda & Central India Railway for a total of 3,300 yards of Rexine leather cloth.

Barrow Barnsley Main Collieries Limited has placed orders for a total of 200 twelve-ton coal wagons divided equally between Charles Roberts & Co. Ltd. and R. Y. Pickering & Co. Ltd.

The South Indian Railway Administration has placed the following orders to the inspection of Messrs. Robert White & Partners:—

Brandeis Goldschmidt & Co. Ltd., 100 tons of copper ingots.

Beckett, Laycock & Watkinson Limited, 10,000 Beclawat metal louvres.

John Walsh & Co. (Birmingham) Ltd., approximately 2,000 carriage panel sheets.

S. A. Gilsoco, 24½ tons of fishbolts and dogspikes.

The Denham Engineering Co. Ltd. has received an order from the Midland Uruguay Railway for one 10½-in. centres sliding, surfacing, and screw-cutting lathe.

The Vulcan Foundry Co. Ltd. has received an order from the Crown Agents for the Colonies for one locomotive boiler required for a 2-8-2 locomotive, Mauritius Government Railways.

The Newport & South Wales Tube Co. Ltd. has received an order from the Great Western of Brazil Railway for 3,200 solid drawn steel boiler tubes.

The Darlington Railway Plant & Foundry Co. Ltd. has received an order from the Nyasaland Railways Limited for 18 sets of switches and crossings for 60-lb. rails.

The American Locomotive Co. Ltd. has received an order from the Union Pacific Railroad for 20 heavy-duty type locomotives to cost about 3,000,000 dollars.

Bayliss, Jones & Bayliss Limited has received an order from the Cordoba Central Railway for 13,000 steel fishbolts, nuts, and washers for 70-lb. rails.

Leyland Motors Limited has received orders from Southdown Motor Services Limited for two Tiger passenger vehicles; from City of Oxford Motor Services Limited for one Cub passenger vehicle; from the Sheffield Corporation for six oil-engined and torque converter Tigers; from the New Zealand Government Railways for one Tiger and one

Cub; and from the Melbourne Tramways for one Tiger passenger vehicle.

John I. Thornycroft & Co. Ltd. has received a further repeat order from the Great Western Railway for 15 Handy class two-ton forward control chassis, similar to a large number of two-ton Thornycroft vehicles already in service. These chassis, of type BE/FB4/1 and 9 ft. 6 in. wheelbase, are fitted with a 49-b.h.p. four-cylinder side-valve petrol engine. The turning circle is under 38 ft., and the chassis weight with full equipment is 34½ cwt.

The Chicago, Burlington & Quincy Railroad is planning the purchase of eight million dollars' worth of new coal cars, stock cars and refrigerator units, says Reuters Trade Service from New York. Equipment trust certificates will be issued to finance the purchase. The Gulf, Mobile & Northern Railroad is also reported to be planning extensive purchases of freight and passenger equipment through the issue of equipment trust certificates.

The Controller of Stores, Great Indian Peninsula Railway, Lower Parel, Bombay, invites tenders receivable by November 26 for the supply of parts of 100-lb. B.H. points and crossings.

Tenders are invited by the Great Southern Railways, receivable by December 2, in Dublin, for quantities of miscellaneous stores, required for periods of six to twelve months beginning January 1, 1937.

The Egyptian State Railways Administration is inquiring for the supply of a number of perishable goods trucks. Tenders are due at the General Management, Cairo, by January 12, 1937.

Tenders are invited by the Assam-Bengal Railway, receivable by November 30, at 56, Victoria Street, S.W.1, for 36 four-wheeled underframes, I.R.S. type MC, and 20 four-wheeled platform trucks without wheels and axles.

The South African Railways & Harbours Administration is calling for tenders, to be presented in Johannesburg by December 14, for bridgework, including provision of two overhead footbridges and strengthening of some existing bridges. Firms desirous of offering bridgework of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

The Government of India, Railway Department, Railway Board invites tenders, receivable by December 14 at the Office of the Director, Mechanical Engineering, Railway Board, New Delhi, for the supply of the following broad and metre-gauge I.R.S. wagons without wheels and axles, for construction in India and required on the Indian Railways, for delivery between April 1, 1937, and March 31, 1938: 87 broad-gauge BVG type goods brake vans; six broad-gauge CE type explosive wagons; one broad-gauge TM type molasses tank wagon; and seven metre-gauge MBTOX type oil tank wagons.

OFFICIAL NOTICES

Great Southern Railways Company.

CONTRACTS, 1937.

THE Directors of the Great Southern Railways Company are prepared to receive Tenders for the supply of the undermentioned Stores for Six and Twelve Months commencing 1st January, 1937:—

No. of Form	No. of Form
Ambulance sets and refills .. 43	Foundry requisites (wire brushes, etc.) .. 42
Asbestos sheeting, packing, etc. .. 40	Galvanized roofing, buckets, etc. .. 23
Axles, steel crank, for locos .. 101	Grates, stoves, etc. .. 24
Belt, train light .. 44A	Glass, sheet and plate .. 27A
Bolts and nuts, rivets, coach screws and washers .. 15	Glass sundries .. 27B
Brass fittings for water .. 26A	Hardware, brass and iron .. 17
Brass fittings for carriages .. 18	Implements, sundry .. 21
Brooms and brushes .. 13	India rubber goods .. 9A
Canvas and sacks .. 6	India rubber hoses, steam heating .. 54
Canvas for wagon tarpaulins .. 6A	Laces, carriage .. 7A
Castings, malleable .. 11	Leather and leather goods .. 12
Cement, Portland .. 34	Lamp founts .. 18A
Clothing, waterproof .. 9B	Lead, sheet pipe, etc. .. 161
Copper nails, rivets and washers .. 115	Locks, keys, etc. .. 19
Drysalteries .. 83	Nails .. 31
Drawing materials .. 83	Nuts, black and bright .. 15A
Emery and glass cloths .. 28	Office sundries (such as ink, pens, pencils, rubber stamps, typewriter ribbons, pins, toilet paper, etc. .. 81
Envelopes .. 82	Oils, linseed .. 162

No. of Form	No. of Form
Pins, gimps, panel; and riddles .. 30B	Timber, red deals, DUBLIN .. 36
Pipes, sewer, plaster of Paris, etc. .. 32	Timber, Flooring, DUBLIN .. 37A
Pots, porous, etc. .. 52	Timber, deals and Putty, glaziers' .. 2A
Rainwater goods, etc. .. 25	Timber, deals and flooring, CORK .. 38
Rope, manila, and twine packing .. 4	Timber, deals and flooring, LIMERICK .. 38A
Screws and split pins .. 14	Timber, deals and flooring, WATERFORD .. 38B
Shovels, spades, etc. .. 21A	Tubes and fittings, iron and steel .. 29
Soft goods, linoleum, carriage rugs, etc. .. 7B	Tyres, steel, for carriages and wagons .. 105
Sponge cloths, mops and wicks .. 5	Washers, steel lock .. 50
Steel plates for loco. boilers .. 116	Waste, cotton .. 5A
Steel plates, sheets and bars .. 123	Wire, iron and steel, and fence staples .. 30A

Forms of Tenders can be obtained on payment of 6d. each from the Stores Superintendent, General Stores Department, G.S. Railways, Inchicore, Dublin. Applications for forms by post must be accompanied by Postal Order. Stamps cannot be accepted. All enquiries for information should be directed to the Stores Superintendent.

Patterns may be inspected at the General Stores Department, Inchicore, on and after the 9th instant, between the hours of 10.0 a.m. and 4.0 p.m. (except Saturdays).

Tenders must be enclosed in the envelope supplied for the purpose with each Schedule and must be posted so as to be with the undersigned before 5.0 p.m. on Wednesday, the 2nd December, 1936.

The Directors will not consider any Tender unless it is furnished on the Company's Form,

and do not bind themselves to accept the lowest or any Tender.

The decision of the Directors will be communicated not later than Friday, 15th January, 1937, to those Firms only whose Tenders are accepted.

By Order,
H. S. COE,
Secretary.

Kingsbridge Station,
Dublin.
November, 1936.

The Bengal and North Western Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of:—

SIX LOCOMOTIVE TANK ENGINES

as per specification to be seen at the Company's Offices.

Tenders addressed to the undersigned, and envelope marked "Tender for Locomotives," with name of firm tendering, to be lodged not later than Noon on the 8th day of December, 1936.

For each Specification a fee of £1 will be charged, which cannot, under any circumstances, be returned.

The Directors do not bind themselves to accept the lowest or any Tender.

By Order of the Board,
W. R. IZAT,
Managing Director.

237, Grisham House,
Old Broad Street,
London, E.C.2.
11th November, 1936.

Faspos Fireproofing

On November 5 Imperial Chemical Industries Limited gave a demonstration of a new chemical fireproofing preparation, to which the name Faspos has been given. Two wooden huts had been prepared and astride each sat, appropriately enough, a guy. One of these, the guy included, had been impregnated with Faspos. Both huts were then set side by side and simultaneously fired with blazing wood shavings. The flames rapidly broke through the sides of the untreated hut and reduced both it and the guy to a charred mass. The Faspos treated hut and guy, on the other hand, withstood the flames and showed only the slightest charring.

The guys not only provided a topical allusion to the date, but they also served to demonstrate the different applications of Faspos. Faspos compounds are available in three types: No. 1 is for general purposes and interior fireproofing; No. 2 for external treatment; and No. 3 for brush or spray treatment of erected timber. All three compounds are applied in the form of solutions in water, and their basic constituent is monammonium phosphate, the decomposition of which is responsible for their fireproofing effect. The wooden hut used in the test was, therefore, impregnated with Faspos No. 2, but the different materials, including paper and materials, used in the guy gave scope for the use of Faspos Nos. 1 and 3.

The method of fireproofing with Faspos recommended by the manufacturers as giving the best results is that of pressure impregnation. This is

carried out by a process similar to that used for creosoting. Alternative methods are hot-and-cold steeping and surface treatment by brushing or spraying. After-treatment of the processed timber is not seriously influenced by any of these methods of application, while the stability of the Faspos solutions under normal conditions, and the degree of permanence of treatment with them, permit of stack or kiln-drying of the treated timber in the usual way.

The cost of producing seasoned fire-resistant timber by these methods depends very largely on the facilities at the operator's disposal, but, taking as a basis the quantity of Faspos as 12 per cent. of the original weight of the timber, the cost of proofing a soft wood by pressure impregnation, followed by kiln drying, works out at about 1s. 10d. to 2s. a cu. ft. or £15 to £17 per standard.

Tests have indicated that no difficulty should be experienced in applying any common finish. Fireproofed wood has been distempered, painted, varnished, and french-polished in exactly the same way as ordinary wood. In one case, however, precaution is needed; silicate paints flake off fireproofed wood owing to chemical interaction. Hence, if a silicate paint is to be used on fireproofed wood, the wood must first be given an oil-bound priming coat of sufficient thickness to insulate the silicate coat from the salts in the wood. Owing to the presence of very minute Faspos crystals, fireproofed wood is slightly more difficult to plane and saw than ordinary wood. Gluing may be carried out satisfactorily, and, al-

though it is not possible to make creosoted timber fire-resisting by application of Faspos solutions, dried Faspos treated timbers may be creosoted in a normal manner. Faspos proofed wood is immune from fungi attack.

A booklet giving full details of properties of, tests, and methods of applying, Faspos is obtainable from Imperial Chemical Industries Limited, Millbank, S.W.1.

L.M.S.R. PROPERTIES FOR AUCTION.

—By direction of the board of the London Midland & Scottish Railway, a variety of freehold properties and building land in the Borough of Derby and the City of Nottingham will be offered at auction at the L.M.S.R. station, Derby, on November 26. For disposal in Derby are 11 acres of building land in London Road and 1½ acres in Osmastron Road, a block of offices in Midland Road, licensed premises and dwelling houses. In Nottingham there are blocks of houses in Woolmer Road and Glapton Road. There will be put up, too, freehold properties and building land at Ashbourne, Anbergate, Ripley, Heanor, Langley Mill, Spondon, Borrowash, Chellaston and Long Eaton, Derbyshire; and at Stapleford, Bulwell, Basford and Dunkirk, Nottinghamshire. The total of the gross rents amounts to £2,260 a year.

Forthcoming Meetings

Nov. 16 (Mon.)—Entre Rios Railways Co. Ltd. (Ordinary General), River Plate House, Finsbury Circus, E.C.2, at 2.30 p.m.

Railway Share Market

Profit-taking sales have led to an easier tendency in most sections of the Stock Exchange after the large rise in prices established recently. Sentiment in the Home Railway market was affected by general market conditions and also by disappointment with the past week's traffic figures, which are the least satisfactory for some time. Most of the junior stocks reacted fractionally, but the disposition is still to take a favourable view of traffic prospects, and, so far as can be judged, there has been no heavy selling in evidence.

L.M.S. ordinary at 32½ was a relatively firm feature on the traffic gain of £37,000. The 4 per cent. preference and 1923 preference were fairly steady and are expected in many quarters to appreciate favourably as time proceeds. Southern preferred at 97½ and the deferred at 26½ were also relatively steady, despite the disappointing traffic gain of only £4,000.

Great Western suffered rather sharply from profit-taking, but later became firmer at 60 on satisfaction with the past week's return. The latter shows a gain of £10,000. On the other hand, L.N.E.R. stocks were very dull and lower on the traffic figures, which in this case disclose an improvement of only £1,000 for the past week. The market is beginning to pay attention to the possibilities attaching to the projected amendment of the scheme of railway freight rebates and the method by which the railways will be reimbursed for the sums overpaid by them in the past. It is generally believed that repayments will probably be made over a long period of years. London Transport "C" stock reacted further on growing fears that no increase in dividend seems likely for the current year.

Argentine railway issues were again the most active feature in the foreign railway market, but the tendency was to rather

lower prices, awaiting the trend in traffic receipts over the next few weeks and also confirmation or otherwise of reports that the Argentine Government may abolish exchange control. The recently-issued report of the Central Argentine Railway illustrates how net revenue has been affected by exchange losses. In the past year the loss borne by this railway was over £1,000,000. B.A. Pacific, Central Argentine and B.A. Great Southern ordinary stocks were all moderately lower on the week. Debenture stocks were firmer and higher prices were made by B.A. Western 4 per cents. at 81 and by Central Argentine 5 per cents. at 91. Elsewhere, San Paulo declined sharply to 80, but Leopoldina preference was fractionally better and Antofagasta was favoured. Canadian Pacific maintained the better tendency which developed recently. American rails were inactive on Wednesday, as Wall Street was closed for Armistice Day.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1935-36	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffic to Date		Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1935		Totals			Increase or Decrease	Highest 1935	Lowest 1935	Nov. 11, 1936	Yield % (See Note)		
						This Year	Last Year								
			£	£		£	£								
Antofagasta (Chili) & Bolivia	834	8.11.36	12,830	—	45	615,060	558,480	+	56,580	Ord. Stk.	23	1415½	23	Nil	
Argentine North Eastern ..	753	7.11.36	9,835	+	1,022	177,514	153,781	+	20,733	"	7	4	8	Nil	
Argentine Transandine ..	—	—	—	—	—	—	—	—	—	A. Deb.	491½	30	50	8	
Bolivar ..	174	Oct., 1936	5,900	+	600	63,600	60,600	+	3,006	6 p.c. Deb.	13	5	7½	3	
Brazil ..	—	—	—	—	—	—	—	—	—	Bonds.	14	11	16	11	
Buenos Ayres & Pacific	2,806	7.11.36	79,824	+	4,383	1,418,870	1,400,042	+	18,828	Ord. Stk.	101½	47½	11	Nil	
Buenos Ayres Central ..	190	24.10.36	\$154,300	+	\$43,900	\$2,355,400	\$2,124,800	+	\$231,600	Mt. Deb.	21	10	30	Nil	
Buenos Ayres Gt. Southern	5,084	7.11.36	117,412	+	4,192	2,088,667	2,262,123	+	173,456	Ord. Stk.	27	131½	23	Nil	
Buenos Ayres Western ..	1,930	7.11.36	41,471	+	3,751	757,114	738,282	+	18,832	"	24	10	19	Nil	
Central Argentine ..	3,700	7.11.36	144,512	+	26,110	2,609,260	2,239,133	+	370,127	"	177½	7	19	Nil	
Do. ..	—	—	—	—	—	—	—	—	—	Divd.	9	31½	10	Nil	
Cent. Uruguay of M. Video	273	31.10.36	13,117	+	1,107	200,146	157,375	+	42,771	Ord. Stk.	81½	3	5	Nil	
Do. Eastern Extn.	311	31.10.36	2,572	+	680	31,037	24,808	+	6,229	"	—	—	—	—	
Do. Northern Extn.	185	31.10.36	1,326	—	165	18	24,438	+	4,751	"	—	—	—	—	
Do. Western Extn.	211	31.10.36	1,110	+	294	18	17,401	+	3,999	"	—	—	—	—	
Cordoba Central ..	1,218	7.11.36	26,350	—	5,960	19	615,610	591,440	+	24,170	Ord. Inc.	4	1	3	Nil
Costa Rica ..	188	31.8.36	17,130	+	458	8	38,568	30,402	+	8,166	Stk.	35	30	36	59½
Dorada ..	70	Sept., 1936	14,400	+	2,200	39	126,600	105,500	+	21,180	1 Mt. Db.	103½	102½	104½	54
Entre Rios ..	810	7.11.36	13,206	+	1,966	19	238,049	223,183	+	14,866	Ord. Stk.	15	61½	11	Nil
Great Western of Brazil	1,082	7.11.36	12,100	+	2,810	45	344,200	339,610	+	4,600	"	1½	—	—	—
International of Cl. Amer.	794	Sept., 1936	\$305,126	+	\$20,883	40	\$3,929,758	\$3,549,254	+	\$380,504	"	—	—	—	—
Interoceanic Mexico ..	—	—	—	—	—	—	—	—	—	Is. Pref.	1½	5½	1½	Nil	
La Guaira & Caracas ..	223	Oct., 1936	4,305	+	1,405	43	45,850	37,885	+	7,965	S. k.	81½	8	5½	Nil
Leopoldina ..	1,918	7.11.36	22,385	+	3,673	45	875,335	800,703	+	74,631	Ord. Stk.	81½	21½	6	Nil
Mexican ..	483	31.10.36	\$378,210	+	\$33,700	18	\$4,532,900	\$4,352,100	+	\$180,800	"	11½	14	—	—
Midland of Uruguay ..	319	Sept., 1936	7,673	+	2,348	13	23,343	16,336	+	7,007	"	11½	12	—	—
Nitrate ..	397	31.10.36	4,102	—	5,005	44	101,887	126,964	+	25,077	Ord. Sh.	64½	42½	39½	—
Paraguay Central ..	274	31.10.36	\$2,279,000	+	\$197,300	18	\$46,290,000	\$39,035,000	+	\$7,255,000	Pr. Li. Db.	80½	60	78½	7½
Peruvian Corporation	1,059	Oct., 1936	82,005	+	112	18	339,051	299,665	+	39,386	Pref.	105½	67½	101½	Nil
Salvador ..	100	31.10.36	\$14,000	+	\$3,889	18	\$194,127	\$214,322	—	\$20,195	Pr. Li. Db.	65	61	15	Nil
San Paulo ..	153½	1.11.36	28,992	+	5,915	44	1,294,350	1,076,142	+	218,308	Ord. Stk.	80	35	80½	3½
Taltal ..	164	Oct., 1936	3,665	—	275	17	12,420	12,640	—	220	Ord. Sh.	111½	118	116	71½
United of Havana ..	1,353	7.11.36	15,320	+	1,673	19	291,311	304,361	—	13,050	Ord. Stk.	31½	1	2½	Nil
Uruguay Northern ..	73	Sept., 1936	897	+	299	13	2,510	1,797	+	783	Deb. Stk.	41½	215½	5½	Nil
Canada ..	23,613	31.10.36	1,275,570	+	114,653	44	31,646,918	28,591,217	+	2,055,701	"	—	—	—	—
Canadian National ..	—	—	—	—	—	—	—	—	—	4 p.c.	—	—	—	—	—
Canadian Northern ..	—	—	—	—	—	—	—	—	—	Perp. Dbs.	78½	52½	73½	57½	
Grand Trunk ..	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	103½	93	103½	37½	
Canadian Pacific ..	17,220	7.11.36	604,600	+	33,200	45	23,443,200	21,819,200	+	1,624,000	Ord. Stk.	141½	85	141½	Nil
India ..	1,329	29.10.36	43,612	+	4,949	29	693,327	665,012	+	28,315	Ord. Stk.	92½	77½	96½	37½
Assam Bengal ..	202	10.10.36	1,537	—	988	28	61,687	74,527	—	12,840	Ord. Sh.	105	77½	66½	7½
Barsi Light ..	2,112	20.10.36	71,977	+	6,953	3	319,411	124,143	+	15,268	Ord. Stk.	301½	291	313	5½
Bengal & North Western ..	161	10.10.36	4,260	+	97	28	68,668	70,092	—	1,424	"	127½	122	122½	31½
Bengal Doonars & Extension	3,268	20.10.36	169,050	—	4,275	23	3,306,886	3,503,621	—	196,735	"	105	100½	102½	37½
Bengal-Nagpur ..	3,072	31.10.36	235,425	+	375	30	4,698,600	4,512,525	+	186,075	"	115½	110	112½	5½
Bombay, Baroda & Cl. India	3,229	29.10.36	118,725	—	20,938	29	2,971,191	2,971,070	+	121	"	128½	113½	112½	8
Madras & Southern Mahratta	572	20.10.36	11,879	+	421	3	22,699	21,591	+	1,108	"	294	262	311½	5½
Rohilkund & Kumaon ..	2,532	10.10.36	112,404	—	3,057	23	2,142,290	2,148,716	+	6,426	"	119½	104½	103½	5½
South Indian ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Various ..	204	Aug., 1936	73,900	+	3,933	48	719,218	710,272	+	9,946	—	—	—	—	—
Beira-Umtali ..	15	Sept., 1936	1,639	+	478	40	13,631	13,358	+	273	—	—	—	—	—
Bilbao River & Cantabrian	620	20.10.36	9,109	—	1,008	29	128,677	121,536	+	7,141	Prf. Sh.	2	15	1½	51½
Egyptian Delta ..	104	29.8.36	568	—	2,514	35	33,629	62,623	—	28,994	Inc. Deb.	3½	2	3½	Nil
Great Southern of Spain ..	1,625	Sept., 1936	165,531	—	2,618	38	1,947,395	1,809,454	+	137,901	"	—	—	—	—
Kenya & Uganda ..	—	—	—	—	—	—	—	—	—	B. Deb.	48	36	45½	71½	
Manila ..	—	—	—	—	—	—	—	—	—	1 Mg. Db.	104½	100	103	47½	
Mashonaland ..	913	Aug., 1936	112,733	—	4,955	48	1,131,918	1,277,362	—	145,444	Inc. Deb.	98½	93	95	49½
Midland of W. Australia	277	Sept., 1936	14,970	+	930	27	785,241	615,577	+	169,668	"	—	—	—	—
Nigerian ..	1,905	3.10.36	39,222	—	9,302	48	2,075,634	2,126,923	—	51,289	4 p.c. Db.	105½	101	105½	31½
Rhodesia ..	1,538	Aug., 1936	207,304	+	4,235	28	17,315,387	15,904,024	+	\$1,411,393	"	—	—	—	—
South African ..	13,263	17.10.36	635,914	+	25,182	52	9,689,925	9,421,092	+	268,833	"	—	—	—	—
Victoria ..	4,728	June 1936	703,693	+	16,855	59	59,281	88,575	—	29,294	"	—	—	—	—
Zafra & Huelva ..	112	Aug., 1936	1,438	—	10,664	35	—	—	—	—	—	—	—	—	—

Note.—Yields are based on the approximate current prices and are within a fraction of 1½.

† Receipts are calculated @ 1s. 6d. to the rupee. ‡ ex dividend. Salvador and Paraguay Central receipts are in currency. The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.

Electric Railway Traction

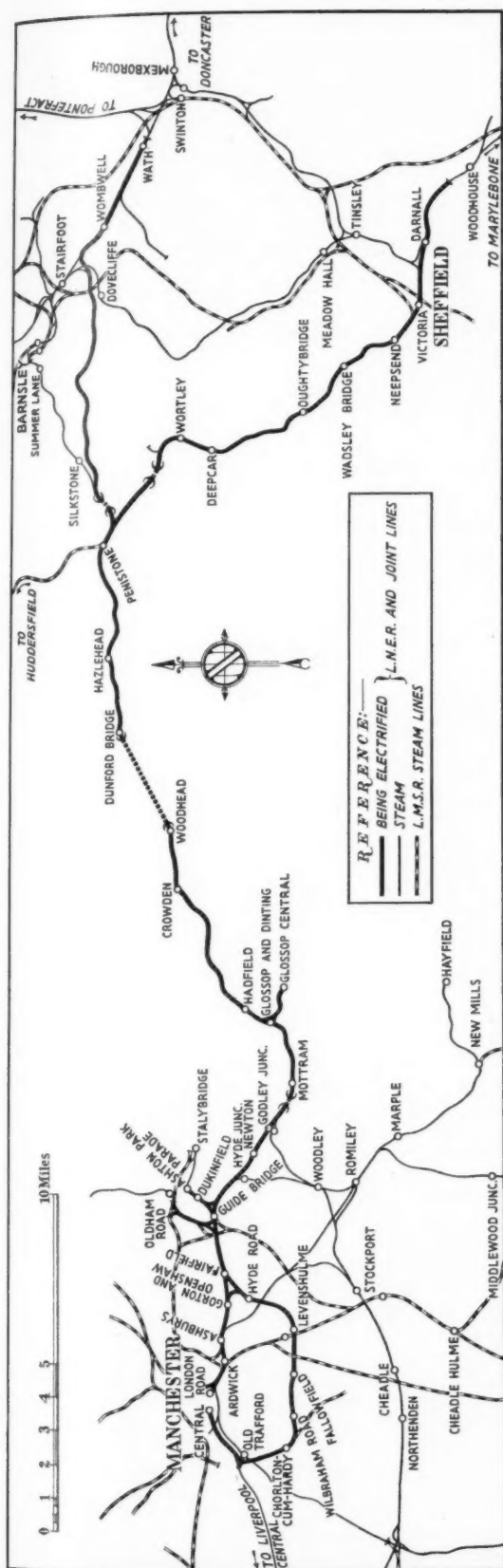
An Epitome of Southern Railway Electrification

AS befits any paper written by a leading traffic officer, Mr. E. C. Cox's contribution to the Institute of Transport proceedings on November 9 was replete with figures of a statistical and financial nature, and, to borrow a stock phrase of reviewers, it should become a standard work on the particular subject, viz., the Southern Railway electrification. Here we have a detailed account of the pre-war and post-war electrification on the Southern and its constituent companies, together with full details of traffic densities, revenues, current consumption and failures, and all from the man who probably has had a larger share than any other departmental officer in putting the benefits on the ready shoulders of the public. And it is a swan song, for Mr. Cox retired on October 10 after 25 years as a Superintendent of the Line or Traffic Manager. The Southern Railway electrification shows evidence that the complete scheme now in operation, involving 438 route and 1,088 track miles, was envisaged by some one mind nearly two decades ago, for the successive extensions made since 1924 have been carried out with unrivalled speed and smoothness, and have dovetailed neatly into the steam and electric services surrounding them. From the traffic point of view the key position of the inner electrified network of the Southern is at London Bridge, where in the busiest hour of the day 94 up trains arrive at the station, 48 of them going on through the Borough Market bottle-neck to Cannon Street and Charing Cross. In addition, there are nearly as many down trains passing through and starting from the station. Although 18,000 passengers alight at Charing Cross in the busiest hour compared with 16,000 at Cannon Street, they are crowded into 19 trains compared with the 29 serving Cannon Street. Between London Bridge and Cannon Street are two up and two down lines, whereas on the Charing Cross route there is only one up and one down track between Borough Market and Metropolitan junctions, and it is not at once apparent why, with constant electric extensions costing many millions of pounds, this three or four-hundred yard section has never been quadrupled, in order to give Charing Cross the service it needs. The traffic density figures given by Mr. Cox for the London area led us to make some investigations as to the number of trains on the main lines to the Sussex coast, and the total we found for a bank holiday are given on the diagram reproduced alongside our abstract of Mr. Cox's paper elsewhere in this issue. South of Croydon the most densely trafficked section is from Hayward's Heath to Keymer Junction with nearly 150 trains a day in each direction, and another is from Willingdon Junction to Eastbourne, where a maximum of 12 trains an hour is dealt with. Electrification of the main lines has enabled the train service from London to Brighton to be increased by 60 per cent. on a normal day, and to Eastbourne by 30 per cent., but in the suburban area the increase has been 70 per cent. during the rush hours and 150 per cent. during the slack midday period. The figures of expenditure and revenue given at the end of Mr. Cox's paper should do much to convince those sceptics who still pursue

schemes of intense steam-worked suburban traffic. The expenditure on Southern electrification to date has been £16,000,000, only half of which has required fresh capital, and, after allowing for all increases in working expenses due to the greatly increased service, the net revenue from passengers carried on the electrified lines is £1,890,000 a year greater than in the last year of steam operation. Mr. Cox gave a sum of £200,000 as being the extra working cost of electrification, due largely to the greater number of trains run, but in the discussion he made it clear that this amount did not include any portion of the costs of the colour-light signalling or the Wimbledon flyover, which works would have been necessary if steam traction had been retained.

Multiple-Unit Express Trains

WITH the invention of multiple-unit control by the late Frank J. Sprague in the early 'nineties, there came into being a new railway operating unit with outstanding and immediately obvious advantages for urban and suburban passenger traffic, but many years elapsed before it was applied to fast work either on main lines or on short distance inter-urban services. Indeed, the application of the multiple-unit train to express work is entirely post-war, but within the present decade a further development has occurred with the introduction of the streamlined set train of light weight. In most cases, it must be admitted, the advantage of the aerodynamic contour is not immediately apparent, for in few instances do such electric trains exceed 70 m.p.h., and the most valuable feature, reduced weight without reduced strength, has become glossed over in an endeavour to take full advantage of the well-fostered public craze for the word "streamline." The balance of sanity is retained in part by those amazing schedules of the Chicago, North Shore & Milwaukee Railroad, where start-to-stop timings up to 75 m.p.h. are maintained over short distances by square-ended four and six-car multiple-unit trains collecting their current by means of a trolley! On the Brighton section of the Southern Railway, top speeds of 77-78 m.p.h. are common with six and twelve-car sets of unstreamlined shape, and a top speed of 88 m.p.h. has been recorded. The two-car Dutch electric trains are examples in which the lighter weight more than balances any gain due to streamlining, for rarely, if ever, do they exceed 68 m.p.h., although running long distances at 63-65 m.p.h. On the Bavarian division of the Reichsbahn a small number of fully streamlined two-car trains have been set to work this year between Berchtesgaden, Munich, and Augsburg; they are designed for a top speed of 100 m.p.h. and are developments of the two-car semi-streamlined sets with a top speed of 75 m.p.h. introduced on the Bavarian lines in 1935. Two of them have nose-suspended motors with individual axle drive (Kleinow and Brown Boveri) and the third has nose-suspended motors with the usual solid drive. On 3,000-volt d.c. lines, as against the 15,000-volt single-phase system in Germany, the Italian State Railways are using triple-car electric train sets, but up to the present no spectacular speeds are required in normal service, although 106 m.p.h. has been attained on test.



3,955,723. It is estimated that under electric traction this figure will be approximately 4,009,140 a year made up of 952,914 passenger-engine-miles, 2,546,226 freight-engine-miles, and 510,000 shunting engine miles. The total annual trailing ton-miles to be worked electrically, including shunting, will be approximately 1,304,700,000, which represents a traffic density of 17,500,000 trailing ton-miles per route mile a year. Under electric traction it is hoped to accelerate the average start-to-stop speeds of the trains over the Manchester—Sheffield route by 25 to 40 per cent., as indicated in the table below.

Type of train	Existing steam service, m.p.h.	Proposed electric service, m.p.h.
Express passenger	40	50
Slow through passenger	25	35
Suburban passenger	22	28
Express braked freight	28	40
Ordinary freight	18	25
Heavy freight and mineral	15	22

This does not mean that all the end-to-end speeds will be increased in like proportion, for the station stops will remain of the same order as at present. Typical comparative schedules will be as shown in the last of the accompanying tables.

Train	No. of stops	Existing steam timing		Under electrification	
		Time, including stops	Schedule speed	Time, including stops	Schedule speed
Express Passenger :		Min.	M.p.h.	Min.	M.p.h.
Down : 8.5 p.m. Sheffield to Manchester	Nil	55	45	46½	53½
Up : 10.3 a.m. Manchester to Sheffield	2	65	38.2	50½	49
Express Freight :					
Down : 10.40 p.m. Bridge-houses to Guide Bridge	Nil	74	29.2	54	40
Up : 7.55 p.m. Godley to Woodhouse	Nil	102	22.4	63	36.2
Class "A" Freight :					
Down : 12.9 p.m. Barnard Road to Guide Bridge	Nil	123	17.8	89	24.6
Local Passenger :					
Down : Glossop Cen. to Manchester—Steam	8	40	19.5	32	24.3
Electric	9				
Up : Manchester to Glossop Cen.—Steam	9	41	19.0	37½	20.8
Electric	9				

The more efficient operation of traffic through the double Woodhead tunnel was one of the strongest incentives to electrification. These tunnels each convey a single line of railway, one used in the up direction and the other in the down, and they are 3 miles long. They are situated between Woodhead and Dunford Bridge and owing to the higher speed at which trains will pass through them the line capacity will be greatly increased. Up to the present the capacity of the tunnel in the up direction has been approximately four trains of all descriptions an hour (partly due to the length and up grade and partly to the smoke nuisance), and it is this fact which has determined the traffic density over the whole line between Sheffield and Manchester. Under electrification it is considered that it will be possible to increase the capacity of this tunnel by 25 per cent., and a further benefit will ensue by reason of the longer life of the rails in the tunnel. Owing to the present atmospheric conditions, the life of the standard 95-lb. rails is limited to 3-3½ years as compared with a normal life in the open of 15-17 years.

The electrification of the tunnels will materially reduce the rate of corrosion, but owing to the wet nature of the various strata through which the tunnels are pierced this will not be eliminated. However, it is estimated that the rails will last from 5 to 6 years, or 33 to 50 per cent. longer than under existing conditions.

Some of the heaviest locomotive work on the L.N.E.R. is at present performed over the Manchester—Sheffield line. Coal trains from Wath concentration yard with a trailing weight in excess of 1,000 tons are worked at present up the 1 in 40 gradient approaching West Silkstone junction by four steam locomotives, two in front and two behind. Under electrification the banking of

these trains will continue. A trailing load of 250 tons is normal for passenger trains, but during the summer season and at holiday times this weight is increased to approximately 350 tons. The electric locomotives to be constructed for express passenger service will be designed to deal with trains of this size.

The electrical equipment will include 12 rectifier sub-stations having a total installed capacity of 40,000 kW. At the time the announcement was made of the list of works submitted for Government Assistance, it was estimated that the cost of the Manchester—Sheffield conversion would be £2,500,000 and this figure is approximately correct.

NEW G.W.R. AND L.P.T.B. JOINT ELECTRIC LINE

North-west extension of Central London tube

IT will be recalled that in June of last year there was an agreement between the Treasury, the London Passenger Transport Board, and the Great Western and London & North Eastern Railways, which provided for the construction and electrification by the G.W.R. of two additional electrified surface tracks alongside its lines from North Acton to Ruislip—as shown on the accompanying map. The only existing electrified line of the Great Western Railway is from Bishop's Road to Hammer-smith, which is operated by the L.P.T.B., as will be the Ruislip extension of the Central London.

Parliamentary powers for the new line were sought by the Great Western Railway in its last Bill, and Royal Assent was obtained on July 14 of this year.

By means of the new electric tracks the Central London Railway, which now turns away to the south-west at Wood Lane, will be extended via North Acton to Ruislip, thereby providing direct through services to and from the City area.

The length of the new lines from North Acton to Ruislip will be 8.3 miles; the distance from North Acton to Marble Arch along the existing lines is 5.37 miles. The new electric tracks will proceed in their entirety on the south side of the Great Western Railway's Paddington—Birmingham main line, and will be self-contained, having no interceptions except at Ruislip, where a siding to the Royal Air Force depot will cross both electric lines.

Beginning with a junction to the Central London Railway on the western side of Willesden Lane bridge, the new down track will swing to the south and pass under the Ealing line of the Central London. This will involve the construction of a fly-under line and heavy retaining walls. The new up line will run direct.

Both the tracks will then pass under a factory siding, and continue to rise to the same level as the main lines. The new railway will then pass under the District Railway, about three-quarters of a mile further on, and proceed thence to Park Royal West station (G.W.R.), which is to be demolished. The public road known as Hanger Lane will be pierced by a bridge, to permit of the passage of the tracks, and the bridge carrying Brentham Road over the railway will be lengthened. The present Brentham halt will be closed. A quarter-of-a-mile further on the River Brent will be crossed by means of a viaduct; by dropping the level of the tracks, it will be possible to reduce the average height of this structure to about twenty-four feet above ground.

The present embankment beyond the viaduct is formed

on treacherous material, and piling will be necessary to support the widened structure to carry the new lines. A little farther on Perivale Lane will be crossed, which will necessitate the lengthening of the existing bridge. In order to pass over the Greenford East loop, a viaduct about 20 ft. high, and 600 ft. in length is to be constructed, as owing to the levels it is not possible for the line to pass under the East loop and rise in time to cross over the Greenford Road.

The level of the lines will be on a slightly rising gradient, increasing to 1 in 60 when passing over Greenford Road, and falling again to the former level while passing over Oldfield Lane and through Greenford station. A new station for the electric lines will be built at Greenford, apart from the existing G.W.R. structure.

Eventual movement of traffic between West Ealing and the electric Ruislip lines is expected, and interchange will be effected at Greenford, by means of a bay road between the running lines. A reversing siding will be provided immediately west of the station for this purpose.

The line will then pass on embankment and the tracks will rise and later fall on a grade of 1 in 60 to the Grand Union Canal, beyond Greenford, which is to be crossed on a girder bridge.

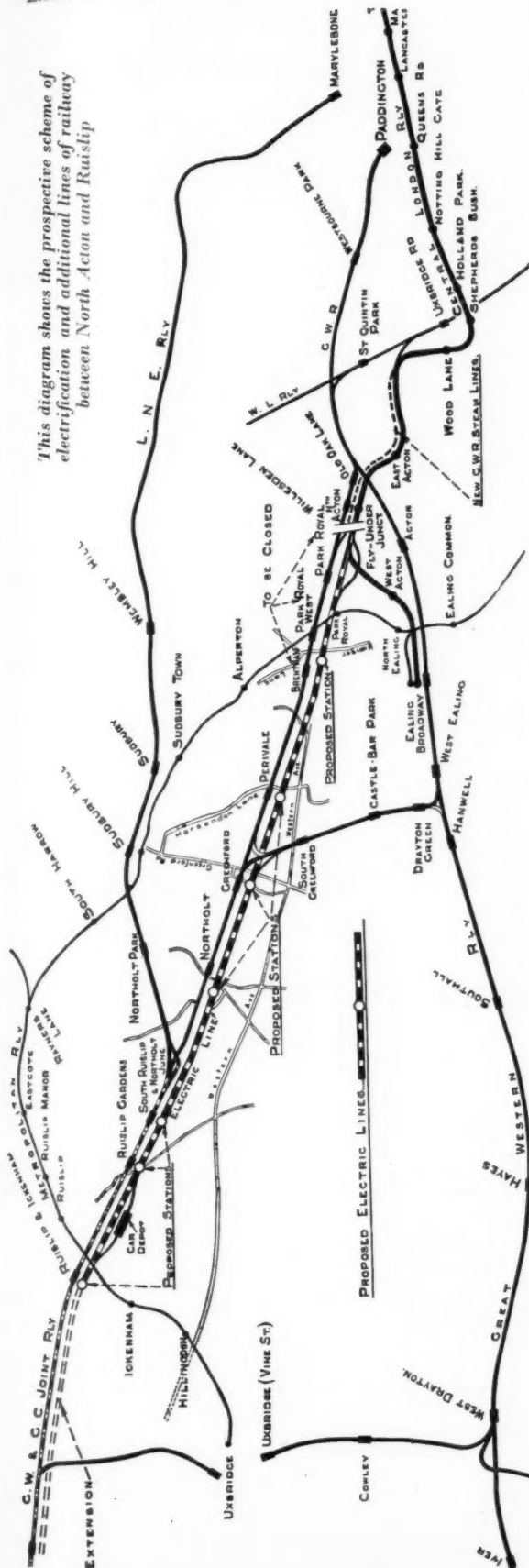
From Northolt the new tracks will continue at the same level as the existing railway until Northolt junction is reached, then the electric lines will drop to the same level as the L.N.E.R. down line, and run parallel to the termination of the electric tracks at Ruislip.

Ruislip Gardens halt is next passed, and the line will cross the L.P.T.B. line (Metropolitan Railway) by means of a new bridge about half a mile east of Ruislip & Ickenham station. The existing connections into the Royal Air Force depot will cross the electric lines on the level.

The termination of the line is at present proposed to be at Ruislip. Between Ruislip Gardens and Ruislip & Ickenham stations a site has been selected for an electric carriage depot, which will be constructed with access at both ends from the new track. The initial capacity will provide for stabling 150 carriages, with sufficient land to extend the capacity to 300 when necessary. The depot will provide for the maintenance of the stock, and will be equipped with automatic washing and other machines, and vacuum plant, all on the most modern principles.

The exact positions of the stations, of which there will be seven in number, have not yet been definitely settled. It can be said, however, that there will be stations at Hanger Lane, Perivale, Greenford, Northolt, South

This diagram shows the prospective scheme of electrification and additional lines of railway between North Acton and Ruislip



Ruislip, Ruislip Gardens, and Ruislip & Ickenham. The Northolt station will be specially equipped to deal with racecourse as well as ordinary passenger traffic. Consideration is being given for suitable names, in order to distinguish the new stations from the existing ones on the Great Western line.

MORE ITALIAN ELECTRIFICATION.—On October 28, the Italian State Railways opened to 3,000 volts d.c. electric traction the lines from Bivio Galleria to Postumia; from Bivio Galleria to Bivio Viadotto; and from San Pietro del Carso to Fiume. The energy is supplied by the Adriatic Electric Company's network at 133 kV. to a railway-owned converting station and then through the railway administrations 60 kV. line to the rectifier substations.

During the twelve months from October, 1935, to October, 1936, the State Railways took delivery of 58 electric locomotives, 6 motor-coaches with driving trailers, and 24 motor-coaches for solo operation. Orders have been passed for over 100 further electric locomotives for service on the Salerno-Reggio Calabria line, which is due to be opened to electric traction on April 21, 1937.

P.O.-MIDI ELECTRIC TRAFFIC.—At the end of 1935, the Midi section of the P.O.-Midi Railway had 1,863 route km. (1,160 route miles) electrified, equivalent to 45 per cent. of the system. Electrically-hauled traffic amounted to 15,373,380 train-km. (9,560,000 train miles) and 4,481,895,200 trailing tonne-km. (2,750,000,000 trailing ton-miles), these figures being respectively 50.44 and 49.06 per cent. of the total traffic excluding diesel railcar services. The energy consumption measured at the substation bus bars was 182,000,000 kWh. compared with 167,000,000 kWh. in 1934, the difference being due mainly to the opening of the Montauban-Toulouse-Sete line towards the end of the year.

On the P.O. portion of the whole railway, the electrically-hauled traffic in 1935 amounted to 14,815,649 train-km. (9,210,000 train miles) and 7,775,101,900 trailing tonne-km. (4,750,000,000 trailing ton-miles), 26.95 and 36.26 per cent. respectively of the P.O. traffic apart from diesel railcar services. The energy consumption was 216,000,000 kWh., and the route length of electrified line was 653 km. (405 miles).

At the end of 1935 the whole P.O.-Midi system had 577 electric locomotives, 151 motor-coaches (including motor-driven baggage vans), and there were on order for delivery in 1936, ten electric locomotives, 19 motor-coaches, and 38 trailers, of which 7 were driving trailers.

BRITISH ELECTRIC LOCOMOTIVE.—For service at the Kearsley generating station of the Lancashire Electric Power Co. Ltd., the British Thomson-Houston Co. Ltd. has delivered a double-bogie d.c. electric shunting locomotive, the mechanical portion of which was built by R. & W. Hawthorn-Leslie & Co. Ltd. In general design this locomotive is similar to another machine built about eight years ago by the same two companies, but the new locomotive has a cab 2 ft. longer, so that one or two passengers may be carried from the nearest railway station to the generating plant. Both locomotives normally are used for the haulage of coal wagons over a grade of 1 in 27 between the railway sidings and the power station. Each is of the Bo+Bo type with four motors having a rating of 60 h.p. at 500 volts. Current is collected by a single-shoe pantograph mounted on the cab roof; the control is of a simple type, and includes a drum type controller, resistances, and main circuit breaker. The straight air brake applies blocks on all wheels, the air being supplied through a BTH compressor. The controller and air brake handles are mounted in the centre of the steeply cab. The locomotive weight is about 26 tons.

PROGRESS OF THE SOUTHERN RAILWAY ELECTRIFICATION

By E. C. COX, M.V.O., late Traffic Manager, Southern Railway*

DURING the five years from 1923-1928, the electrified route mileage of the Southern Railway was increased from 73 to 275, and this progressive policy has been pursued with the result that 438 route miles, representing 1,088 track miles, are now electrified. This represents 60·5 per cent. of the whole of the electrified track mileage in Great Britain and forms the largest electrified suburban system in the world.

Rolling Stock

The standard suburban train in rush periods consists of two three-coach motor-units, with a two-coach trailer set between, giving 112 first and 540 third class seats, a total of 652. During slack periods the trains are reduced to six or three cars. On the South London line and the Wimbledon and West Croydon line, the traffic is lighter, and a two-car unit is employed, giving 16 first and 144 third class seats on the South London line, and 12 first and 112 third class seats on the Wimbledon and West Croydon line. For the fast main line services corridor coaches with refreshment facilities are provided. Each fast train unit consists of six coaches, weighs 265 tons, seats 72 first and 240 third class passengers, and has eight 225 h.p. motors.

The semi-fast trains consist of four or eight coaches, but when necessary are made up to twelve coaches. A four-car unit seats 70 first and 204 third class passengers, weighs 139 tons, and has 1,100 h.p. derived from four motors. The stock employed between Brighton and Worthing, Seaford and Hastings, consists of two-car non-lavatory units seating 24 first and 135 third class passengers.

The total amount of electric stock employed is 2,341 coaches, formed as follows:

No. of units	Type	No. of coaches
<i>Main-line Stock</i>		
40	6-coach corridor sets	240
3	5-coach all-Pullman sets	15
33	4-coach lavatory sets	132
10	2-coach lavatory sets	20
70	2-coach (non-lavatory) sets	140
		547
<i>Suburban stock</i>		
460	3-coach sets	1,380
195	2-coach trailer sets	390
12	2-coach sets	24
		1,794

Carriage sheds for the electric stock are provided at Addiscombe (32 cars), Effingham Junction (70 cars), Orpington (64 cars), Peckham Rye (12 cars), Selhurst (96 cars), Slades Green (64 cars), Strawberry Hill (32 cars), Wimbledon Park (48 cars), Brighton (136 cars), Ore (48 cars), and West Worthing (36 cars). The greater part of the carriage cleaning is done in these sheds. Carriage washing machines are provided at Brighton, Selhurst, Slades Green and Orpington, and one is being erected at Durnsford Road.

The chief reasons which caused the Southern Railway to make extensive use of colour-light signalling are:—

First.—The saving of time previously taken in transmitting block telegraph signals from signal box to signal box, especially where automatic signals are now installed.

Second.—The centralised working of crossings, junctions and signals from one box instead of their being spread over a number of boxes, combined with the exact knowledge of the whereabouts of the various trains as shown on the illuminated diagram.

Third.—No unnecessary delay from the operation of safety rules involving the checking of trains at a signal when the signal next ahead is at danger.

Fourth.—Drivers are able to run with confidence and consequently at high speed, as the signals are easily sighted and give a clear and definite indication of their own position and that of the signal immediately ahead.

Fifth.—A greater measure of safety is assured by the track circuit control of points and signals.

Sixth.—All the foregoing advantages are more pronounced during foggy weather, as drivers can more readily sight the signals, while signalmen are kept fully acquainted by means of the diagram with the actual state of the various lines. Since the introduction of colour light signalling no fogmen have been necessary on any lines equipped.

Power Supply

Current for the Eastern and Central suburban districts is obtained from the London Electric Supply Corporation, and for the South Western section from the company's own generating station at Durnsford Road; for the main line from Purley to Brighton, Worthing, Eastbourne and Hastings, current is obtained from the grid.

In the suburban area there are 45 substations manned by 158 attendants who operate the switches controlling the supply of current to the conductor rails, and three remote-controlled unattended substations. On the main line 41 substations are spaced about three miles apart and are unattended; they are controlled electrically from central control rooms at Three Bridges, Swanley and Ore, where indicators are provided to enable supervision to be kept over the power supply throughout the main line area. This supervisory remote control is a development of the remote control introduced in the suburban area 11 years ago.

In 1935 the electric train services consumed 386,511,334 units, of which 102,542,315 were generated in the company's plant at Durnsford Road; 224,807,732 units were purchased from the London Electric Supply Corporation; and the remaining 59,161,287 units were obtained from the grid.

The average cost of the whole supply per high-tension unit was 0·38d. This current then had to be transmitted to the substation and converted into direct current, and this appreciably increased the cost per unit at the track. The average current consumption per car-mile throughout the whole electrified area is 2·38 units, and, the average car-miles per train-mile being 5·74, the current consumption per train-mile is 13·7 units.

As an index of the greater mobility of electric trains it should be noted that while the passenger train-miles per steam engine hour amount to 11·31, the train-miles per electric motor vehicle hour are 19·97, an increase of 76·5 per cent.

Including all the stations in the suburban area there has been in the services to and from London during the rush hour period an average increase of 69·6 per cent. in the frequency. This increase is attributable to electrification, as the rush hour services had reached the maximum

* In a paper read before the Institute of Transport, November 9.

frequency obtainable under steam conditions. The improvement in the service is even more pronounced during the non-rush periods, when the frequency has increased by 148.7 per cent.

Although throughout the Southern Railway only 26.5 per cent. of the track miles is electrified, the electric train mileage exceeds the steam passenger train mileage, the figures for the first half of this year being 14,809,417 electric train-miles and 12,852,851 steam train-miles. Empty electric mileage is less than 1 per cent. of the total electric mileage. Spread over the whole electrified area, the electric train-miles per track-mile amount to 77.7 miles per weekday.

During September the average late arrival of 122,001 electric trains run on weekdays was 0.63 min. During the same month the average late arrival of 81,179 steam trains was 1.39 min. On Sundays, the electric train arrival average was 0.99 min. late and the steam train average 2.34 min. The delays due to electrical defects either in the trains themselves or in the supply of current are negligible, the figures for September, when the electric trains ran 2,557,536 miles, being: *Train defects*—453 min., 0.4 per cent. of total delay. *Failures of current supply*—59 min., 0.06 per cent. of total delay.

There has been a great increase in the business period traffic since electrification. Welling, Bexleyheath and Sidcup, for example—three stations serving the same area—under steam conditions in 1925 handled 1,097,393 passengers; under electrification ten years later, this figure had increased to 4,753,632, exclusive of season ticket holders. During the same period the season tickets issued increased from 8,959 to 57,600. The passenger receipts at these three stations were £54,164 in 1925 and £197,218 in 1935. There has been a similar increase at Belmont, Banstead and Epsom Downs and elsewhere.

The increase in the traffic has not been confined to newly built-up areas; a considerable increase has been obtained generally; for instance, at Tooting Junction station, the number of passengers under steam conditions in 1928 was 65,367 and in 1935 the total was 600,913, while the season ticket issue rose from 414 to 4,353.

The handling of the morning and evening business traffic is one of the greatest problems. During the 24 hours on weekdays, the company's London termini receive 2,427 trains containing about 354,000 passengers. During the three business hours from 7.0 to 10.0 a.m., 520 trains arrive with 226,807 passengers. The traffic is so concentrated that about a third of the day's total, namely, 115,000, arrive during one hour of the morning rush period.

In 1925, 11,000 passengers alighted at Cannon Street during the busiest hour; ten years later the number was 16,000, an increase of 45.4 per cent.; in the same time the number of passengers alighting at Charing Cross during the busiest hour rose from 5,000 to 18,000, an increase of 260 per cent.

In the 1925 business period there were 101 trains to these termini—36 to Charing Cross and 65 to Cannon Street; ten years later the number had increased to 125—59 to Charing Cross and 66 to Cannon Street. In the busiest hour 48 up trains pass through London Bridge, 29 going to Cannon Street and 19 to Charing Cross. During the same hour, 46 trains terminate at London Bridge, a total of 94 up trains in one hour. There is a corresponding number of down trains, as for every up train there must be a down train, otherwise the London terminals would become blocked. All these trains are controlled by one colour-light signal box at London Bridge. At Borough Market junction the path of the 29 trains to Cannon Street is crossed by 19 trains from Charing Cross, which have also to fit in with 20 trains from Cannon Street.

The increase in the rush hour traffic can best be illustrated by the following particulars of the numbers of passengers arriving in London by the Southern Railway between 7.0 a.m. and 10.0 a.m. each weekday:

Year	Passengers
1925	177,260
1930	196,929
1936	226,807

It will be seen that there has been a general increase in the rush hour traffic of 59,547 passengers, or 35.6 per cent., since 1925.

The Victoria to Hastings line, *via* Lewes and Eastbourne, was electrified in July, 1935, and the passengers travelling from Victoria to Hastings by this route during August, 1935, was 15,847 compared with 8,069 in 1934, an increase of 96.3 per cent.; during the same month the traffic from Charing Cross to Hastings *via* Tonbridge, which is still steam operated, fell from 21,535 in August, 1934 to 18,295

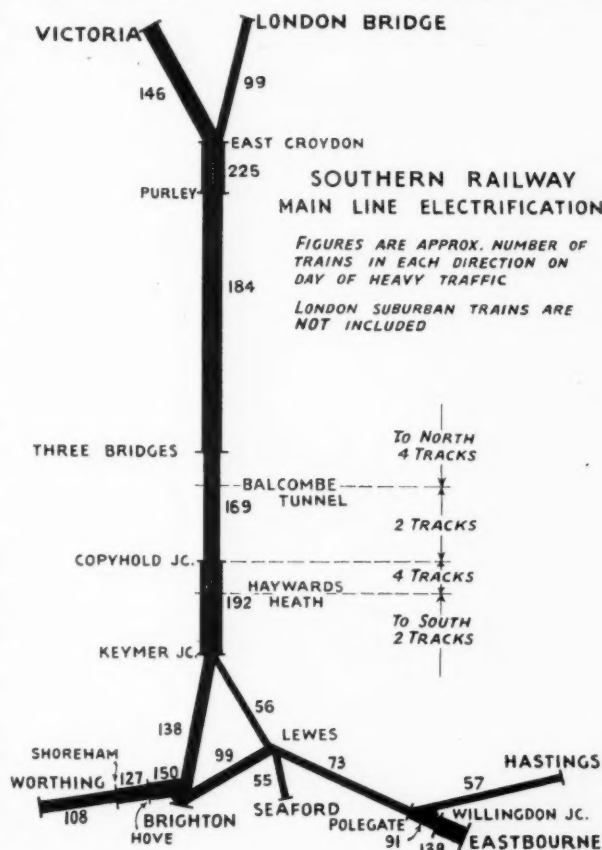


Diagram of main line electrified services drawn up to supplement the data given in Mr. Cox's paper

in August, 1935, a decrease of 15 per cent., notwithstanding the fact that the steam service was improved in 1935 and that it has the shorter and quicker route.

In 1935 the total number of passenger journeys on electrified lines was 256,589,000, an increase of 9,198,000 compared with 1934. On the electrified portion of the main line 16,500,000 passengers were carried in 1935, an increase of 4,000,000 over 1932, the last steam year.

In 1935 the receipts from passengers using the electrified services were £6,833,000, an increase over 1932 of 13 per cent., and compared with the corresponding steam services,

the increase is estimated at £2,090,000, or 44 per cent. On the expenditure side, costs have increased because, although the cost per electric train-mile is less than per steam train-mile, more trains are run. In 1935, the total working expenses were not more than £200,000 higher than the amount which would have been spent on working the displaced steam services.

After allowing for working expenses there was thus in the year 1935 an increase in net receipts from passengers on the electrified lines of £1,890,000 compared with the corresponding net receipts immediately before the various lines were so converted.

The total outlay on electrification is £16,000,000. Of this, about £8,000,000 has been charged to capital expenditure and the other half to revenue. Of the charge to revenue approximately £5,000,000 has been provided from the rolling stock renewal fund, the provision of the electric stock having relieved the company of the liability to renew the displaced steam stock.

Discussion

The discussion on Mr. E. C. Cox's paper was opened by Mr. Roger T. Smith, who recalled a conversation he had some 30 years ago with Sir Herbert Walker, then with the L.N.W.R., which showed even at that early date Sir Herbert was fully aware of the capabilities of electric traction for suburban work; as soon as he went to the L.S.W.R. as general manager he caused the electrifica-

tion of the lines out of Waterloo to be studied, and the lines themselves converted from 1915 onwards.

Lt.-Colonel A. H. L. Mount, of the Ministry of Transport, asked Mr. Cox whether the sum of £200,000 which was given as the extra cost of electric working included any allowance for colour-light signalling or such works as the Wimbledon flyover, and also enquired as to the possibilities of locomotive haulage. In view of the recommendations of the Pringle committee in 1927 that a d.c. voltage of 1,500, with overhead conductor, should be regarded as standard for future main-line conversions in Britain, Col. Mount took it that with third rail main-line traction multiple-unit trains had to be used in preference to locomotives. Mr. A. R. Cooper, Chief Engineer to the L.P.T.B. confirmed that track maintenance costs certainly did rise when an intensive electric service was introduced, but said that methods could be evolved to overcome this to a great extent.

In his reply Mr. Cox intimated that the extra working cost of £200,000 did not include proportions of the cost of colour-light signalling or the Wimbledon flyover, both of which had been necessary for many years irrespective of the form of traction. Regarding locomotive haulage, Mr. Cox foreshadowed developments, more particularly as regarded main-line freight trains and the Newhaven boat trains, but emphasised that the problem of the transfer freight traffic from north to south London, and *vice versa*, would remain.

NOTES AND NEWS

Electrified Mileage in Germany.—The electrified route of the Reichsbahn now totals 2,194 km. (1,360 miles), of which 56 km. (35 miles) represent the Hollental and Dreiseen railways in the Black Forest, electrified at 20 kV. 50 cycles single phase.

P.O. Electrification.—The united Chambers of Commerce of Nantes, Saumur, Angers, St. Nazaire, and district have asked the P.O.-Midi Railway to electrify the main line from St. Pierre des Corps to Nantes and St. Nazaire as soon as possible. It is unlikely that this work will be put in hand until the completion of electrification between St. Pierre des Corps and Bordeaux, conversion work on which section is in the preliminary stage.

Pennsylvania Accelerations.—Further accelerations have been made in the electrically-hauled trains on the Washington-New York main line. The Congressional, the fastest through train, now occupies only 215 min. for the 224.8 miles, inclusive of six intermediate stops, and the start-to-stop speeds rise as high as 70 m.p.h. One of the fastest trains on the route is the 8.0 a.m. out of Broad Street station, which reaches New York in 94 min. at an average of 58.4 m.p.h., including three stops.

Southern Electrification.—Trial trips with multiple-unit trains have been begun between Waterloo and Woking, and it is expected that a regular electric service down to Woking and over the Chertsey loop will be in operation before the end of January. These lines form part of the Portsmouth extensions announced at the end of last year. As described in THE RAILWAY GAZETTE for October 23 and 30, the Southern Railway has decided to electrify the Virginia Water-Reading, Ash Vale-Ascot, and Guildford-Aldershot lines, with a route mileage of 43 and a track mileage of 88, at a cost approaching £1,000,000.

Italian Private Railway Electrification.—The Modena-Vignola local railway is being electrified on the

d.c. system with a line voltage of 3,300, and will be worked by motor-coaches coupled to driving trailers, the two-car sets having a top speed of 45 m.p.h. and a h.p. of 250. The electrification of the Milan-Saronno-Como line of the North Milan Railway is almost completed, and it is expected that the opening to electric traction will take place at the beginning of 1937. The new trains are fabricated of stainless steel. The short Turin-Rivoli electric railway recently acquired from Fiat several new motor-coaches with a top speed of 35 m.p.h.

Three-Phase Locomotive Mileage.—Mileages put up by the three-phase locomotives of the Italian State Railways between heavy repairs frequently exceed 100,000, and as the overall speeds are not particularly high, this often means two years or more out of the shops. For instance, one of the 1-C-1 locomotives, No. E. 333,040, shedded at Bolzano, covered 173,463 km. (108,000 miles) in a period of 28 months between shoppings. On the other hand, the 1-D-1 locomotives of class E. 431, shedded at Leghorn and operating generally on more level lines, cover 125,000 km. (78,000 miles) a year, and 130,000 to 150,000 km. (81,000 to 93,000 miles) between heavy repairs.

Central of Brazil Electrification.—The contract for the supply of power for the first five years to the Central of Brazil electrified lines has been awarded to the Rio de Janeiro Tramway, Light & Power Company at an average price of 74 reis per kWh. According to load variations this price may vary at any given time from 52 to 92 reis.

Journey times on the suburban section, to be opened in January, will probably be reduced by about 30 per cent. compared with the present steam schedules, but it is expected that the fares will go up by at least 100 reis on all sections and that cheap returns will be abolished. This retrograde step apparently is due to the much superior service and accommodation which the electric trains will provide.